



**INSTITUTO SUPERIOR DE CIÊNCIAS DA SAÚDE – NORTE**

**Departamento de Ciências Dentárias**

# **Relatório de Final de Estágio**

**Para obtenção do grau de Mestrado Integrado em Medicina  
Dentária**

**de**

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Quando menos esperamos , a vida coloca diante de nós um desafio que testa a nossa coragem e vontade de mudar.

Paulo Coelho

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A todos vós o meu maior apreço e gratidão .

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## Resumo

O Estágio em Medicina Dentária é um período supervisionado, que constitui um momento de aquisição e aprimoramento de conhecimentos, incluído no respectivo Plano de Estudos, direcionado para aprofundar os conhecimentos teóricos e práticos adquiridos pelo aluno, preparando assim, os alunos para o exercício da profissão. O estágio é constituído por três componentes distintas: Estágio de Clínica Geral Dentária, Estágio Hospitalar e Estágio de Saúde Oral e Comunitária. Durante o estágio foi feita uma pesquisa bibliográfica subordinada ao tema: “Cirugia do terceiro molar lcluso”.

**Palavras-chave:** “Estágio de Clínica Geral Dentária”, “Estágio Hospitalar”, “Estágio de Saúde Oral e Comunitária” e “Cirugia do terceiro molar Incluso”.

## Abstract

The training in Dental Medicine is a supervised period, which is a moment of acquisition and improvement of knowledge, included in the Study Plan, directed to the consolidation and deepening of theoretical and practical knowledge acquired by students, thus preparing the students for the profession. The stage consists of three distinct components: General Practice Dental Training, Hospital Training and Community and Oral Health Training. During the training through a bibliographic research on the theme: “the third molar surgery”.

**Key words:** “General Practice Dental Training”, “Hospital Training”, “Community and Oral Health Training” and “the third molar surgery”.

## **1. Introdução**

O Estágio de Medicina Dentária é um período supervisionado de contacto direto do aluno com as unidades de saúde durante o qual se pretende que, aplique, bem como, aperfeiçoe todos os conhecimentos de prestação de cuidados de saúde oral, conseguidos ao longo dos anos anteriores, preparando assim os alunos para o exercício da profissão. São três as áreas em que o Estágio de Medicina Dentária se desenrola: Estágio de Clínica Geral Dentária, Estágio Hospitalar e Estágio de Saúde Oral e Comunitária que decorreram entre Setembro de 2014 e Junho de 2015.

## **2. Relatório das Atividades Práticas das Disciplinas de Estágio Supervisionado**

### **2.1. Relatório de Atividade por Unidade Curricular**

#### **2.1.1. Estágio em Clínica Geral Dentária**

O estágio realizou-se na Unidade Clínica Nova Saúde do Instituto Superior de Ciências da Saúde – Norte, em Gandra e teve a duração total de 180 horas anuais. O estágio decorreu à segunda-feira, das 19 horas às 24 horas e foi orientado pela Professora Doutora Maria do Pranto. Os atos clínicos efetuados durante este período estão indicados na tabela 1 (Pág.6).

#### **2.1.2. Estágio Hospitalar**

O estágio Hospitalar foi realizado no Centro Hospitalar Vila Nova de Gaia / Espinho, unidade I, com a carga horária de 196 horas de duração às segundas-feiras das 9h às 12:30h, tutelado pela professora mestre Paula Malheiro.

O estágio assegura experiências significativas e exemplificativas da realidade, no sentido de se promoverem as competências necessárias ao desempenho autónomo e eficaz destes profissionais. Os atos clínicos efetuados durante este período estão indicados na tabela 2 (Pág.7).

### **2.1.3. Estágio de Saúde Oral e Comunitária**

Este estágio supervisionado pelo Professor Doutor Paulo Rompante, realizou-se com o propósito de implementar o Programa Nacional para a Promoção da Saúde Oral e teve a duração de 120 horas. Numa primeira fase procedeu-se à construção dos materiais didáticos para as Escolas Básicas (Turmas de Pré,1,2,3 e 4) em Valongo (E1/JI Balsa e E1/JI Campello). Numa segunda fase, diretamente nas escolas, foram realizadas apresentações para a sensibilização das crianças e levantamento de dados para o cálculo de índices CPOD e CPOS. Foram utilizados como recursos: vídeos educativos, apresentações em PowerPoint, escovagem em modelo de boca, panfletos, jogos e materiais para a colheita de dados para os índices e CPOS DPOC (ficha específica), todos os alunos devidamente equipados com bata e máscara e munidos de espelhos descartáveis e luvas. O estágio foi cumprido na sua totalidade. (Anexo – Tabela C)

## **2.2. Considerações finais das atividades de estágio**

As três componentes do estágio foram fundamentais em termos de experiência clínica. Facultaram a aquisição de aprendizagens e conhecimentos deveras importantes para enriquecer o aprendizado e o desenvolvimento das competências pessoais e profissionais.

### **3. Desenvolvimento da fundamentação teórica**

#### **Cirurgia do terceiro molar incluso**

##### **3.1. Introdução**

O problemas são muito comuns na clínica dental, dentes e mais frequentemente estão incluídos são os terceiros molares , que constituem uma parte importante da odontologia , não só devido à sua frequência e variedade, mas por patologia e acidentes muitas vezes desencadeia 1.

O terceiro dente molar é a última a desenvolver o seu apexification , de modo que pode ser facilmente incluída pela falta de espaço na arcada dentária ou à presença de um obstáculo causada por determinadas alterações patológicas tais como as malformações dentárias , cistos, tumores 2-3

Como tratamento primário para os dentes , incluindo a remoção da peça em questão deve ser efectuada , uma vez que a idade dos pacientes extracção se torna mais complicado , além disso, pode vir de um aumento na incidência de lesão ou de deslocamento estruturas anatômicas adjacentes,por isso, é necessário ter em conta as respectivas estruturas de arcadas diferenciando assim a remoção de terceiros molares superiores ou inferiores , uma vez que ambas as peças são cercados por estruturas importantes, como a tuberosidade maxilar e mandibular canal 2.

##### **3.1.1 Condições embriológicas dos terceiros molares.**

É o final do quarto mês de vida fetal quando os germes de dente dos terceiros molares aparecem nas extremidades distais da lâmina dentária 2.

Calcificação deste dente começa em 8-10 anos , mas a calcificação coroa não termina até 15-16 anos ; a calcificação completa de suas raízes não acontecer até cerca de 25 anos de idade , e será feito em um espaço muito limitado 1.



### **3.1.2. Condições anatômicas dos terceiros molares.**

A evolução normal do terceiro molar é frequentemente alterado pelas condições anatômicas e esta anormalidade particular na erupção desse dente a ser encontrado em sua principal causa , a origem da raça humana , a ligação que o homem , como tal, inicia a sua linha evolutiva As diferentes partes da cavidade oral tenha diminuído em proporção com a diminuição da função mastigatória devido às alterações de dieta graduais produzir redução de espaço que produz o terceiro molar 3-4

A evolução deste dente é feito em um espaço muito limitado :

Tomando estruturas anatômicas importantes, tais como o segundo molar , pacote vasculo nervoso , bordo de ataque do ramo ascendente da tuberosidade maxilar, cortical externo e interno, lâmina compacta óssea , região sublingual, região massetérica , genial , e vestibular , espaço temporário , região pterigopalatina - maxilar , o ex- pilar do palato mole , espaço peri tonsilar ; Entre as estruturas mais importantes que entendemos a sua relação de possíveis complicações 1-4

### **3.2. Objetivos**

- Analisar a influência de fatores anatômicos.
- Estabelecer critérios cirúrgicos adequados.
- Compreender os acidentes clínicas e patológicas causadas pelo terceiro molar
- Reconhecer as indicações e contra-indicações para a cirurgia terceiro molar incluído.
- Analisar as possíveis complicações da cirurgia.

### **3.3. Metodologia**

Para responder aos objetivos propostos para a elaboração desta revisão bibliográfica, sendo este um estudo exploratório descritivo, foi realizada uma pesquisa através da base de dados de Biblioteca “Universidad del Pais Vasco” e online” em inglês e español.

### **3.4. Discussão**

É literatura científica extenso e variado relacionado com terceiros molares . Autores de diferentes países têm focado seus trabalhos de investigação sobre este assunto, demonstrando que os terceiros molares é uma parte muito importante da odontologia . Bernal Gomez (4 ) afirma que 65 % dos pacientes com uma idade média de 20 foi um dos quatro molares , de preferência pelo sexo feminino e indivíduos negros têm uma frequência mais baixa , como as mandíbulas Larger permitir erupção completa de todos os dentes. Outras publicações apresentam resultados semelhantes aos acima referidos..5-6.

Teorias que explicam a inclusão é a formação do gérmen, em áreas de área retromolares que se torna importante quando se analisa a anatomia topográfica da região em que é incluído o dente variável , uma vez que a remoção destas partes , sem justificação clínica representa um percentual significativo de casos , ou a cirurgia é indicada abordagem preventiva para evitar o desenvolvimento de outras doenças, tais como o desenvolvimento de cistos , tumores, fraturas do nível de ângulo mandibular , pericoronarite e reabsorção da raiz do segundo molar ( Algozaín e Vines - Garcia) . Deve-se notar a importância de , antes de fazer uma decisão de proceder cirurgicamente avaliar objeções e relações anatômicas que permitirão o clínico para prever com maior certeza o prognóstico e tratamento do fornecendo uma avaliação dos potenciais benefícios ou prejuízos para o paciente poderia ter a cirurgia . Por tudo isso , é extremamente importante para o clínico reconhecer a anatomia normal e variações anatômicas na região quando se trata de avaliar e abordar o tratamento. 7-8

### **3.4.1. Terceiro molar incluso.**

Quando o dente é completamente coberto por osso eo folículo uma vez que eu integrar a data da última erupção.

Uma das causas mais comuns destas alterações é a falta de espaço na arcada dentária , ou a presença de um obstáculo causada por determinadas alterações patológicas tais como as malformações dentárias , cistos, tumores , infecções ou condições pós-traumáticas 3.

Como tratamento primário para peças incluídas a remoção da peça em questão deve ser efectuada , uma vez que a idade dos pacientes torna-se a extracção mais difícil 3.

### **3.4.2. Terceiro molar inferior.**

A extracção de terceiros molares podem ser apresentadas como um trabalho relativamente simples e extremamente duro , o principal factor que determina a dificuldade é a acessibilidade , que é determinada por os dentes adjacentes ou outras estruturas que impedem o acesso de saída e rota . Está precisam de meios adicionais, tais como radiografia panorâmica , tomografia para mostrar com mais precisão a imagem da anatomia da superfície , facilitando desse modo a produção do eixo maior do terceiro molar em relação ao eixo do segundo molar de modo a se aproximar classificação e , assim, tornar a abordagem mais apropriada 9.

- Posição Mesio angular: Reconhecido como o menos difícil porque o ângulo para o segundo molar é dada em uma percentagem mais elevada 9.
- posição horizontal: Quando o eixo maior é perpendicular ao segundo molar em direcção mesial 9 .
- posição vertical: O eixo maior é paralelo ao eixo principal do segundo molar 10 .
- posição Disto vestibular: O eixo principal é angular longe do segundo molar distal se tornando o mais difícil , porque às vezes envolve o ramo ascendente necessitando de cirurgia mais extensa 10.

### **3.4.3. Terceiro molar superior.**

A classificação de terceiros molares apresentam variações mínimas do ângulo dando três tipos mais comuns são:

- Posição Vertical
- Posição disto angular
- posição angular mesial

Em raras ocasiões, encontrar posições como a cruz invertida ou horizontal 11.

A maioria dos dentes do siso são inclinadas em direção à face vestibular do processo alveolar , o que faz com que o osso que cobre mais fino tornando mais fácil o acesso , mas às vezes é localizado no lado palatal dos processos alveolares que resultados na cirurgia mais difícil devido à necessidade de fazer mais osteotomia 12.

#### **3.4.4. Indicações extração do terceiro molar incluso.**

O extrato ou um terceiro molar , é provavelmente uma das decisões tratamento a um rostos profissionais com mais freqüência. Enquanto diagnosticar a remoção de terceiros molares associados patologia é muitas vezes simples , a decisão de remover molares assintomáticos é muito mais conflituosa.

A importância de um planejamento adequado para estas intervenções é relevante e, portanto, classificá-los como segue:

- exodontia preventiva ou profiláctica : A decisão de extrair os terceiros molares profilaticamente depende do equilíbrio entre a capacidade de gerar doença no futuro , os benefícios da cirurgia em idades mais jovens e os riscos em casos que requerem extração 13.
- Exodontia pela infecção : Pericoronitis é a infecção mais comum sendo os adolescentes mais afetados
- Exodontia do dente por motivos ortodônticos : oseodentarias discrepâncias , para auxiliar na manutenção ou retenção dos resultados obtidos com os tratamentos ortodônticos , ou quando o ortodontista precisa seções distally subsequentes da arcada dentária 1 14.
- Razões protéticas e restauradores : Será indicado quando necessário disto acessibilidade segundo molar área gengival para selos ou a colocação de uma prótese de retenção é 14.
- Razões periodontais: Quando os periodontite de controle pode não estar correto no aspecto distal do segundo molar , quer pela dificuldade de acesso ou presença de bolsas periodontais profundas 15.

- Presença de outra doença : a presença de cistos , tumores são as razões óbvias para a cirurgia , apesar de ser sintomatologia tardia al final é indicado 16.

### 3.4.5. Técnica Cirúrgica

Os passos de uma cirurgia do terceiro molar são baseados em cinco etapas básicas:

- **Levante a colgajo** : Para obter acesso para a área e ter visibilidade do osso que cobre a área . Levantar a colgajo deve ser de um tamanho para permitir a estabilização dos separadores de tecido e instrumentos de osteotomia . No entanto, é aconselhável permitir uma incisão amplo acesso ideal ao osso, onde a incisão mais comum nesses casos é o ângulo ; em que o primeiro corte é traçada a partir do centro da face distal do segundo molar que se prolonga para trás sobre variando de acordo com o tipo de peça de retenção . A segunda seção começa na porção distal da margem gengival e para baixo , para frente e para fora n uma área de aproximadamente um centímetro incisão é necessária não para dilacerar os tecidos gengivais quando utilizar elevadores 17.
- **A remoção do revestimento de osso** : Uma vez que o tecido mole é levantado e retraída através da incisão é necessário avaliar a quantidade de osso a ser removido , de acordo com uma posição que tem a peça em questão Inicialmente, a eliminação da oclusal , bucal e distai do osso é necessária . É importante notar que não deve ser feito no caso de remoção molar inferior pela face lingual a possibilidade de lesão do nervo lingual . Enquanto osteotomia pode incorporar uma manobra chamada rebaixo é a remoção de osso entre o dente e o osso cortical no osso esponjoso , fornecendo um ponto de apoio para alavancas para extrair o dente 17.
- **Odonto seção** : Uma vez que o osso quantidade adequada devem ser removidos para avaliar a possibilidade ou necessidade de cortar o dente, seção do dente permite a extração do dente separadamente por alavancas atravez abetura criado por osteotomia.A Direcção da secção do dente é determinada pelo eixo de angulação do dente em relação ao segundo molar.
- **Extração de dente seccionado com Alavanca** : no maxilar inferior são usados mais freqüentemente Alavanca Crier reta , Guindaste pico , estes instrumentos são projetados para não aplicar força exesiva. Mas para manter o dente ou fragmento e aplicar a força na direção certa . A diferença em relação ao terceiro molar reside na escolha de ser mais alavancas instrumentos angulados

freqüentemente como Alavanca Potts, Miller, ou proporcionando maior acesso Warwick nas partes posteriores 18.

- **Preparação de encerramento de feridas** : após a remoção do dente é necessária a utilização de uma lima de osso para eliminar qualquer irregularidade bordas evitando maneira desagradável para o paciente e obter a cicatrização da incisão uniforme 18. Além disso, uma irrigação final e uma inspeção completa deve ser feita antes de fechar a ferida , assegurando hemostasia adequada e a distribuição ideal de pontos. Finalizando o tratamento com medicação adequada , que por preferência são antibióticos como a tetraciclina , o que ajuda na tomada de prevenir alveolite , por um período prescrito pelo operador. Além disso, a administração de uma parte anti-inflamatória e analgésica do tratamento pós-operatório cirurgia 18.

### 3.4.6. Complicações e tratamento pós-operatório após a cirurgia do terceiro molar.

Após a remoção do terceiro molar são sempre mais ou menos no grau de inflamação , dor e trismo .

- **Inflamação** : A remoção cirúrgica do terceiro molar é um trauma , de modo a que a inflamação parece ser uma constante no pós-operatório desta cirurgia . Normalmente,esta presente um grau variável de inflamação.EIsso ocorre gradualmente tendo seu pico entre 48-72 horas. No apos operatorio a cigugia se nenhuma complicação infecciosa, inflamação geralmente diminui a partir da terceira para a quarta dia pós-operatório 1 19.
- **Dor**: inflamação e dor manifestam-se em paralelo e estão intimamente relacionados. É uma dor pós-operatória resultante tipo agudo da agressão cirúrgica , distensão ligamentar , espasmos. dor começa imediatamente após a cessação do efeito anestésico , e irá estabilizar de acordo com o grau de inflamação no segundo e terceiro dia podem ser os dias de mais dor. Quando isto ocorre após 24 horas nós suspeitamos que a possibilidade de uma complicação mais ou menos comum , tais como infecção , alveolite , ou lesão neural 19 20. A dor eo inflamação são indicados (AINES) sendo ibuprofeno a droga mais utilizada e onde existem mais estudos sobre sua eficácia 21.
- **Trismus**: o terceiro sintoma nas complicações pós-operatórias , é a dificuldade em abrir a boca não ser determinada exactamente a causa pode ser um reflexo ou analgésico para a lesão o nervo dentario inferior É um

movimento mais ou menos importante supressão abertura da mandíbula ,  
aparecendo 24-48 horas após a cirurgia há um consenso para dizer que a  
restauração do trismo contínua após a retirada dos pontos 14. Como a dor ea  
inflamação diminuirá a diminuir el trismo diminuir na presença de um trismo  
exes q estar alerta, pois pode estar escondendo um processo inflamatório  
excessiva 14 .

### **3.5. Conclusão**

A partir do acima descrito é importante ter uma visão clara deste tipo de intervenção,  
tendo em conta a idade do paciente, indicações e possíveis complicações , relações  
anatômicas , dependendo da área e da localização em relação ao segundo molar  
qualquer setor superior ou inferior.

Ao mesmo tempo, ter em conta que algumas das indicações para a extracção deve ser  
claro para promover e encaminhar corretamente com segurança casos são muito  
diferentes, expandir o nosso conhecimento com base na extensa literatura .

É absolutamente necessário ter conhecimento adequado para lidar com cirurgias de  
complexidade , mas não antes de ter total confiança para lidar com casos, dependendo  
de muitos factores, puede ser en ocasiones la mejor opción el remitir a un especialista.

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### 3.7. Anexos

**Tabela C.** Cronograma de atividades do Estágio de Saúde Oral e Comunitária nas Escolas da Balsa e Campelo.

**Tabela 1**

<b>Descrição dos atos</b>	<b>Nº de Atos Operador</b>
Triagens	7
Destartarizações	10
Restaurações	41
Endodontias	3
Exodontias	13

**Tabela 2**

<b>Descrição dos atos</b>	<b>Nº de Atos Operador</b>
Triagens	3
Destartarização e Polimento	20
Restaurações	41
Endodontias	3
Exodontias	70
Remoção Sutura	1

## Relatório Final de Estágio

<b>Estágio de Saúde oral e comunitária Escola de Sampaio – Agrupamento de Ermesinde</b>			
<b>Data</b>	<b>Instituição</b>	<b>Turma</b>	<b>Plano de atividades</b>
20 Jan.	Escola de Sampaio	Reunião com coordenadores de estágio comunitário para aprovação do cronograma-	Reunião para aprovação final do Cronograma
27 Jan.	Escola de Sampaio	JARDIM DE INFÂNCIA turma 1	A + D
3 Fev.	Escola de Sampaio	JARDIM DE INFÂNCIA turma 1	B + C
10 Fev.	Escola de Sampaio	JARDIM DE INFÂNCIA turma 2	A+C+D
17 Fev.	<b>Férias Carnaval</b>		
24 Fev.	Escola de Sampaio	JARDIM DE INFÂNCIA turma 2	B
3 Mar.	Escola de Sampaio	ESCOLA EB 1 DE SAMPAIO turma 1	A+C+D
10 Mar.	Escola de Sampaio	ESCOLA EB 1 DE SAMPAIO turma 1	B
17 Mar.	Escola de Sampaio	ESCOLA EB 1 DE SAMPAIO turma 2	A + C + D
24 Mar.	<b>Férias Páscoa</b>		
31 Mar.	<b>Férias Páscoa</b>		
7 Abril	Escola de Sampaio	ESCOLA EB 1 DE SAMPAIO turma 2	B
14 Abril	Escola de Sampaio	ESCOLA EB 1 DE SAMPAIO turma 3	A+C+D
21 Abril	Escola de Sampaio	ESCOLA EB 1 DE SAMPAIO turma 3	B
28 Abril	Escola de Sampaio	JARDIM DE INFÂNCIA turma 1-2	B
12 Maio.	Escola de Sampaio	ESCOLA EB 1 DE SAMPAIO turma 2	B
19 Maio	Escola de Sampaio	ESCOLA EB 1 DE SAMPAIO turma 1-3	B
26 Maio	Escola de Sampaio	Finalizar introdução de dados e preparar apresentação do relatório	
2 Junho	Escola de Sampaio	Finalizar introdução de dados e preparar apresentação do relatório	
9 Junho	Escola de Sampaio	Entrega dos dados e Finalizar a apresentação do relatório	

**A•** Apresentação PowerPoint e Vídeo; **B•** Levantamento epidemiológico (CPO/CPOD) e Questionário com perguntas; **C•** Entrega de Panfletos e Desenhos acerca da Higiene Oral; **D•** Motivação da Higiene Oral.

### **3.8.ARTIGOS**

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#### **Erupción y Retención del Tercer Molar en Jóvenes entre 17 y 20 Años, Antofagasta, Chile**

#### **Eruption and Retention of Third Molars in Young People between 17 and 20 Years of Age, Antofagasta, Chile**

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**RESUMEN:** La retención intraósea y la erupción en malposición de 3Ms han sido muy estudiadas. Son causadas, probablemente, por disminución del tamaño de maxilares por cambios de hábitos alimentarios, reduciendo el espacio retromolar, lo que dificulta la erupción normal entre 15 y 25 años de edad, y produce patologías o molestias por comprometer estructuras orofaciales próximas. Lo anterior, ha promovido la exodoncia profiláctica u ortodóncica, incluso del germen dentario, con altos costos

clínicos, hospitalarios, laborales, comprometiendo parte de los recursos destinados a financiar otros procedimientos quirúrgicos orales, además de riesgos durante cirugía, postoperatorio y lesiones iatrogénicas temporales o permanentes. La muestra consistió en 100 jóvenes de 17 a 20 años de edad (50 mujeres y 50 hombres) de la ciudad de Antofagasta, sanos, sin malformaciones general y maxilofacial, sin haber presentado enfermedades infecciosas que alteraran odontogénesis y períodos eruptivos, sin exodoncias de 3M ni tratamientos ortodóncicos previos al examen de la radiografía panorámica y clasificando erupción de 3Ms según tablas de Pell-Gregory y Winter. Se determina 49,1% de 3Ms retenidos con  $p < 0,05$  significativo respecto dientes erupcionados, predominando retención maxilar, especialmente en mujeres. En todos los casos y en mandíbula predominan 3Ms con impactación mesioangulada ( $p < 0,05$  significativa) y en maxilares la retención vertical ( $p < 0,05$  de significancia). Prevalen 3Ms distoangulados en maxilares, posición que predispone a complicaciones operatorias y postoperatorias en exodoncias. La retención horizontal se aprecia en mandibula, siendo el segundo tipo de retención (21,5% en toda la muestra y 30% en hombres). Sin una decisión clínica que indique la cirugía, se sugiere postegar la exodoncia profiláctica de 3Ms, esperando posible erupción tardía (Hattab, 1997; Ventä et al. 1999, 2004 y Kruger et al.). Meta-análisis demuestra: mínima morbilidad en exodoncias de 3Ms en pacientes de 25 años o mayores, baja incidencia de complicaciones y mínimo impacto en calidad de vida (Haug et al., 2005).

**PALABRAS CLAVE: Tercer molar; Retención; Clasificación de Pell-Gregory; Clasificación de Winter; Odontología.**

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**SUMMARY:** Intraosseous retention and anomalous eruption position of 3Ms had been widely studied. They are probably produced by reducing the size of jaws by changes in eating habits, reducing the retro molar space, making it difficult normal eruption between 15 and 25 years old, producing pathologies or discomfort by compromising nearly orofacial structures. The above, has promoted the extraction or prophylactic orthodontic, even from the dental germ, with expensive clinical cost, hospital surgery, compromising part of the resources to finance other surgical oral procedures, in addition to risks during surgery, postoperative and iatrogenic injuries temporary or permanent. The sample consisted in 100 young people aged 17 to 20 years of age (50 women and 50 men) of the city of Antofagasta, healthy, without general and maxillofacial malformation, without having submitted infectious diseases that distort odontogenesis and periods of eruption, without extractions of 3M nor orthodontic treatments prior to the examination of the x-ray overview and classifying eruption of 3Ms as tables of Pell-Gregory and Winter. It was determined that 49.1 % of 3Ms were

retained, with  $p < 0.05$  significant with regard to erupted teeth, predominate maxillary retention, especially in women. In all cases and in maxilla predominate 3Ms with mesioangular position ( $p < 0.05$  of significance) and in maxillary vertical retention ( $p < 0.05$  of significance). Prevailing 3Ms maxilla with distoangular position, a position that predisposes surgical complications and postoperative extractions. The horizontal retention is apparent only in mandible, being the second type of retention (21.5% in all cases and 30% in men). Without a clinic decision to indicate surgery, we suggest to postpone the prophylactic extraction of 3Ms, awaiting possible late eruption (Hattab, 1997; Ventä et al., 1999, 2004; Kruger et al., 2001). Meta-analyses show minimum morbidity in 3Ms extractions in patients aged 25 or older, with low incidence of complications and minimum impact on quality of life (Haug et al., 2005).

**KEY WORDS: Third molar; Retention; Pell-Gregory classification; Winter classification; Dentistry.**

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## INTRODUCCIÓN

Es conocida la teoría de la reducción terminal dentaria de Adloff (citado por Figún & Garino, 1992) que señala la futura desaparición del 3M en la especie humana, aspecto evolutivo consecuencia de la disminución de la actividad masticatoria. Esta sería una línea evolutiva hacia un número menor de dientes (Shafer et al., 1977). En 2001, Proffit, citado por Arboleda et al. (2006), indica que las tendencias evolutivas han influido en la dentición actual y en la dimensión de los maxilares, en tanto que Bailit (1975) sugiere que la fórmula dentaria futura podría excluir a incisivos laterales, segundos premolares y terceros molares. Björk (1956) señala que el 45% de la población tendrá retención de uno o más 3Ms. Recientemente el examen radiográfico digital de la mandíbula de la "niña Magdaleniense", de 13.000-15.000 años de antigüedad, muestra un 3M retenido en posición mesioangular, considerado el caso más antiguo reconocido de impactación del 3M (Flygare & Öhman, 2008).

Según señalan Figún & Garino, la evolución de los hábitos alimenticios ha contribuido a modificar el tamaño de los maxilares, siendo marcado este cambio a nivel mandibular, aspecto evolutivo del *Homo sapiens sapiens* que se confirma por la disminución progresiva del espacio retromolar entre borde anterior de la rama y cara distal del 3M (Fig. 1), lo que actualmente se determina mediante la clasificación de Pell & Gregory (Fig. 2), que mide el espacio que tiene el 3M para erupcionar entre borde anterior de rama y cara distal del 2M (Sandhu & Kaur, 2005).

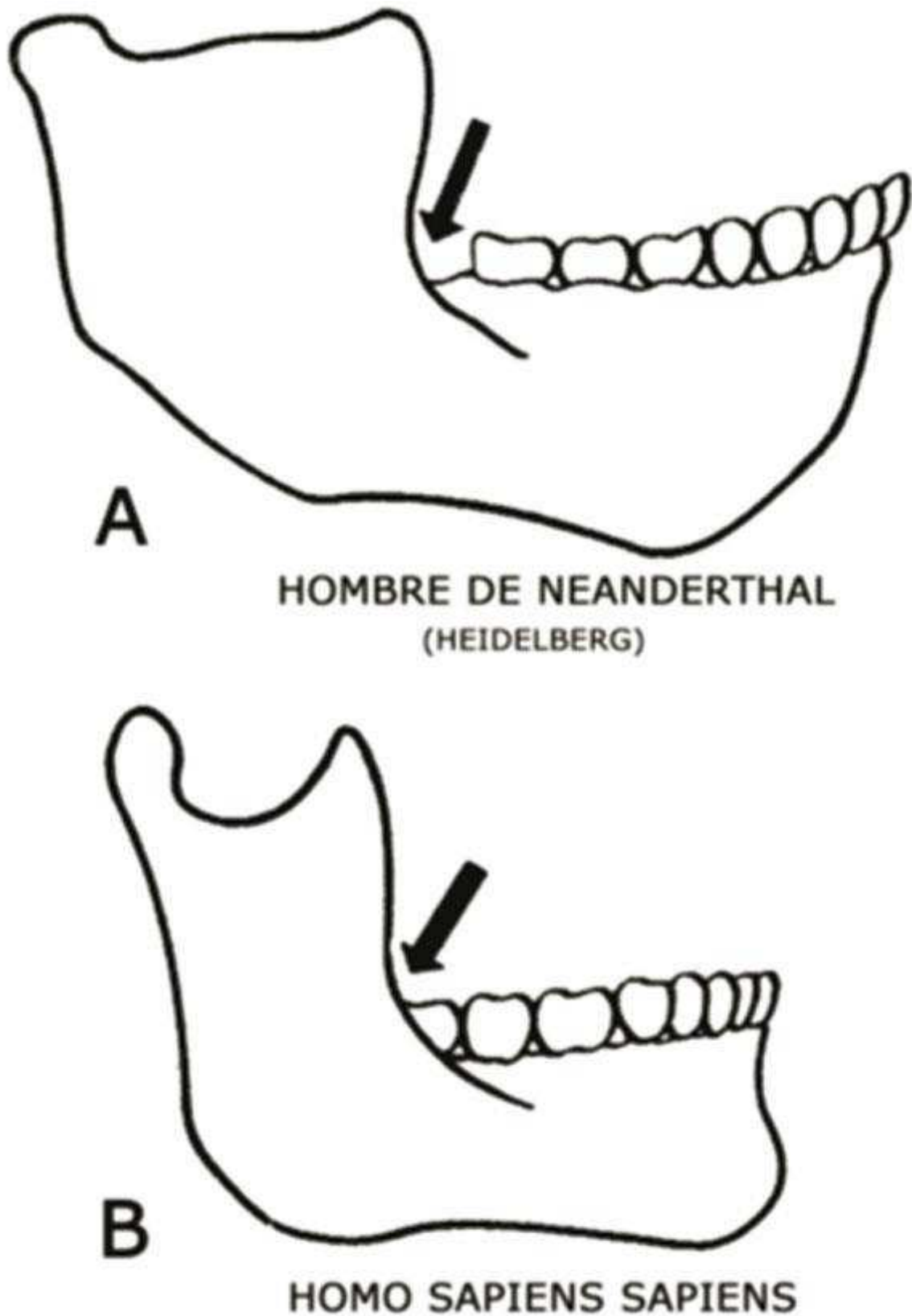


Fig. 1. Disminución del espacio retromolar por variaciones de la forma y tamaño mandibulares producto de la evolución y de los cambios de hábitos masticatorios (adaptado y modificado de Figún & Garino).

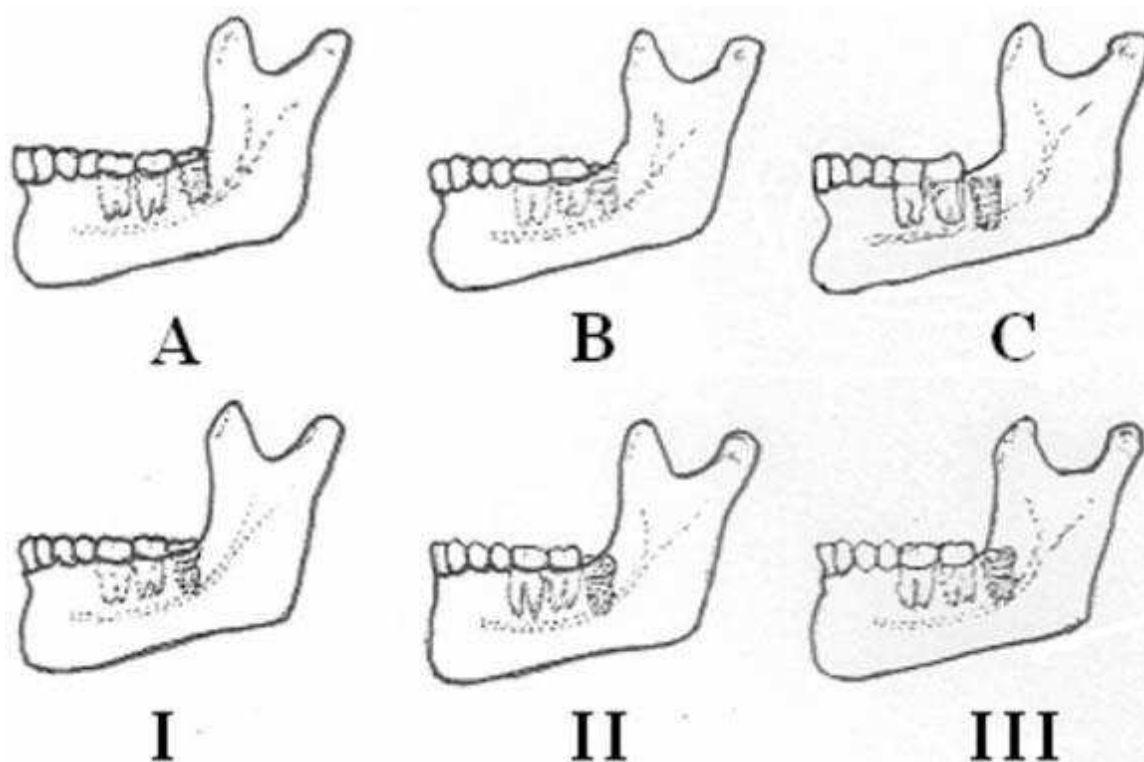


Fig 2. Clasificación de Pell-Gregory sobre nivel de erupción de tercer molar mandibular. A= erupcionado, B= semierupcionado, C= retenido, I= adecuado espacio retromolar, II= espacio retromolar insuficiente, III= tercer molar parcial o totalmente dentro de la rama mandibular (Adaptado y modificado de Halmos et al., 2004).

Un punto de vista que apoya la teoría de la evolución, se basa en la presunción que los maxilares han ido disminuyendo su tamaño durante la evolución humana, probablemente como resultado de una reducción evolutiva en el tamaño corporal genéticamente determinado, concepto que justifica la gran incidencia de agenesia de 3Ms inferiores (Anderson et al., citado por Sarmiento & Herrera, 2004).

Kruger, en 1984 (citado por Nicodemo Philo et al., 2008), señala que una dieta más refinada, requiriendo menos masticación, ocasiona esta tendencia, haciendo menos necesario un aparato masticatorio potente. Pos estas y otras razones, un número cada vez mayor de personas presenta inclusiones dentarias y agenesias.

Hattab & Alhaija (1999) señalan que la menor exigencia masticatoria a consecuencia de los hábitos alimenticios actuales disminuye el tamaño de los maxilares y dificulta la erupción del 3M, favoreciendo la retención.

Confirma las hipótesis anteriores, la investigación realizada en adolescentes nigerianos que habitaban en el medio rural y que a los 19 años de edad tenían erupcionados todos los 3M, sin agenesia y sin retenciones y que por necesidades alimentarias, debían utilizar en forma enérgica su aparato masticatorio (Odusanya & Abayomi, 1991).



Los aumentos de la agenesia y de la retención del 3M ha ido de la mano con la evolución humana. Nicodemo Filho et al. (2008) destacan la opinión de antropólogos que afirman que el crecimiento constante del cerebro aumenta el volumen de la cavidad craneana en desmedro de los maxilares, lo que contribuye a que un número cada vez mayor de personas presenten alteraciones en la erupción normal de 3Ms.

La revisión de literatura establece un amplio rango de 3M no erupcionados, desde 22,3% planteado por Björk hasta 66,6% determinado por Vënta et al., (1991); en cambio, como fue señalado anteriormente, Odusanya & Abayomi comprueban 100% de erupción en nigerianos. Silvestri & Sing (2003) hacen referencia que un 65% de la población humana de 20 años de edad ha tenido, a lo menos, un 3M impactado.

El período normal de erupción del 3M (entre los 17 y 25 años de edad) y la mayor calcificación de los maxilares que complica dicha erupción, la malposición post erupción de dichas piezas dentarias con severas alteraciones de la oclusión y apiñamiento dentario, el aumento del acceso a atención odontológica de especialistas odontopediatras y ortodoncistas, la información transmitida como referencia parental señalando las molestias y tratamientos sufridos durante el largo período eruptivo, así como, un amplio abanico comunicacional que permite acceder a mucha información al respecto, han provocado un aumento de la exodoncia profiláctica y de la recomendación ortodóncica de exodoncia (Olate et al. 2007).

Friedman (1983, 2007) indica al respecto, que pese a que 3Ms producen condiciones que justifican su exodoncia, se ha visto que estos dientes son removidos rutinariamente para prevenir serios malestares que no tienen soporte científico. Impactación es el término usado más frecuentemente para describir un proceso quirúrgico más que un diagnóstico clínico. Señala que el alto costo acumulativo de las cirugías del 3M excede los costos de cualquier otro procedimiento quirúrgico y recomienda restringir el pago de seguros para cirugías profilácticas del 3M, lo que liberaría grandes sumas de dinero o recursos económicos que podrían ser usados en pacientes con reales enfermedades dentales. Susarla & Dodson (2005), señalan que los costos clínicos de la exodoncia del 3M irrogan el 50% de todos los procedimientos quirúrgicos orales.

En este mismo sentido, Silvestri & Sing se refieren al poco valor funcional que se otorga al 3M y que, asociado a una alta tasa de dolor y malestar que producen durante el período eruptivo ha estimulado los procedimientos quirúrgicos, con alto costo por tiempo laboral perdido, radiografías, medicación, anestesia o costos hospitalarios, pérdida de ingresos por licencias, etc. Friedman reitera que el procedimiento quirúrgico no está exento de riesgos, tales como parestesia, daños iatrogénicos como fractura mandibular, compromiso de ATM, seno maxilar, tuberosidad del maxilar, dientes vecinos y hasta la muerte por causa de la anestesia general. Además, no debe olvidarse que los 3Ms pueden ser muy importantes con fines protésicos, cuando se han perdido otros dientes.

Siendo el 3M el diente que provoca mayores patologías asociadas con su presencia, retención, erupción, variabilidad de posición una vez erupcionado y cuyo síntoma principal es el dolor que produce, así como las dificultades quirúrgicas durante su exodoncia tales como el ya señalado riesgo de fractura mandibular y otras iatrogenias (Halmos et al.) y las complicaciones postquirúrgicas que conlleva (2,27% de los pacientes atendidos en el año 2006, en la red del Ministerio de Salud de Chile presentaron reacciones adversas producto de la extracción del 3M, Ministerio de Salud de Chile, 2008), así como los importantes aspectos económicos involucrados en tratamiento por ausencias laborales y licencias médicas pre y postquirúrgicas (Friedman, 1983, 2007; Cauvi & Feldman, 1989; Ahlqwist & Gröndahl, 1991; Feldman et al., 1995; Martínez et al., 1995; Muhonen et al., 1997;

Punwutikorn et al., 1999; Silvestri & Sing; Chaparro-Avendaño et al., 2005), es que efectuamos este estudio radiológico para determinar el grado de erupción y situación de retención de 3Ms en una muestra de jóvenes de 17 a 20 años de edad que habitan la ciudad de Antofagasta, como un aporte a la anatomía odontología y poder efectuar comparaciones de los resultados con los obtenidos por otros investigadores.

## MATERIAL Y MÉTODO

Se revisaron alrededor de 3.000 fichas clínicas desde el archivo de Clínica de Ortodoncia Manquehue de Antofagasta, Chile, eligiendo 100 casos de individuos jóvenes, entre 17 y 20 años de edad, con una edad promedio de 18 años y 6 meses de ambos géneros (50 hombres y 50 mujeres). [Tabla I.](#)

Tabla I. Características de la muestra.

Género	n	Edad	Rango edad	%
Masculino	50	18 años 7 meses	17 años-20 años 11 meses	50,0
Femenino	50	18 años 5 meses	17 años-20 años 11 meses	50,0
Total	100	X 18 años 6 meses	17 años-20 años 11 meses	100,0

Las radiografías panorámicas debían corresponder a la primera radiografía diagnóstica de pacientes sanos, sin ningún tipo de malformaciones general y maxilofacial, que no hubiesen presentado enfermedades infecciosas que alteraran la odontogénesis y los períodos de erupción, sin exodoncias de ningún 3M y sin tratamiento ortodóncico previo al examen radiográfico.

De los casos seleccionados se registraron los siguientes datos: Nombre, edad, fecha de nacimiento y del examen radiográfico, historia clínica relevante, presencia de agenesias, grado de formación (clasificación de Nolla) y nivel de erupción del 3M (clasificaciones de Pell & Gregory (1933) y de Winter (1926), [Fig. 2](#) y [Tabla II](#)), antecedentes que fueron vertidos a un protocolo de investigación, tomando registro fotográfico de cada radiografía panorámica. [Tabla II.](#)

Tabla II. Clasificaciones de grados o niveles de erupción de terceros molares.

Clasificación de Pell-Gregory	Winter
<ul style="list-style-type: none"> <li>• Relación del 3º molar con rama mandibular:                             <ul style="list-style-type: none"> <li>➢ Clase I=Espacio entre la superficie distal del 2º molar y rama es mayor que diámetro mesiodistal del 3º molar.</li> <li>➢ Clase II= Espacio entre la superficie distal del 2º molar y rama es menor que diámetro mesiodistal del 3º molar.</li> <li>➢ Clase III= El 3º molar está parcial o totalmente dentro de la rama mandibular.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Profundidad relativa del 3º molar:                             <ul style="list-style-type: none"> <li>➢ Posición A= La parte más alta del 3º molar está al mismo nivel o por encima del plano oclusal del 2º molar.</li> <li>➢ Posición B= La parte más alta del 3º molar está entre la línea oclusal y el cuello del 2º molar.</li> <li>➢ Posición C= La parte más alta del 3º molar está al mismo nivel o por debajo del cuello del 2º molar.</li> </ul> </li> </ul>
	Tipos de 3º molares en relación a su posición respecto eje longitudinal del 2º molar: <ul style="list-style-type: none"> <li>• Vertical</li> <li>• Mesia angulado</li> <li>• Disto angulado</li> <li>• Horizontal</li> <li>• Vestibulo versión</li> <li>• Linguo versión</li> <li>• Invertido</li> </ul>

Los datos fueron tabulados en Microsoft Excel. Para el análisis estadístico se empleó programa Statgraphics Plus 5.1

## RESULTADOS

Los resultados obtenidos del análisis estadístico determinado para la muestra de jóvenes de 17 a 20 años de edad de la ciudad de Antofagasta, Chile, se detallan en las Tablas siguientes (Tablas III a VIII).

Tabla III. Clasificación Pell-Gregory. Erupción de terceros molares en relación a profundidad relativa (maxila-mandíbula) y relación con la rama mandibular en terceros molares inferiores. Mujeres y hombres de 17-20 años de edad, Antofagasta, Chile (n=50).

Mujeres n=165 terceros molares						Hombres n=167 terceros molares					
Maxila n=83			Mandíbula n=82			Maxila n=85			Mandíbula n=82		
1.8	2.8	3.8	4.8	1.8	2.8	3.8	4.8	1.8	2.8	3.8	4.8
Nivel A=8	Nivel A=9	Clase I=25	Nivel A=8	Clase I=28	Nivel A=9	Nivel A=10	Nivel A=12	Clase I=32	Nivel A=10	Clase I=29	Nivel A=11
18,6%	22,5%	64,1%	20,5%	65,1%	20,9%	23,8%	27,9%	74,4%	20,5%	74,4%	28,2%
B=11	B=11	Clase II=2	B=16	Clase II=2	B=14	B=10	B=13	Clase II=1	B=19	Clase II=4	B=14
25,6%	27,5%	5,1%	41%	4,7%	32,6%	23,8%	30,2%	2,3%	41%	10,2%	35,9%
C=24	C=20	Clase III=12	C=15	Clase III=13	C=20	C=22	C=18	Clase III=10	C=14	Clase III=6	C=14
55,8%	50,0%	30,8%	38,5%	30,2%	46,5%	52,4%	41,9%	23,3%	38,5%	15,4%	35,9%

Tabla IV. Clasificación de Winter. Nivel de erupción del tercer molar respecto de la cara distal del segundo molar. Mujeres, hombres y total de muestra de jóvenes de 17-20 años de edad, Antofagasta, Chile (n=100).

Clasificación Winter	Mujeres n=50				Hombres n=50				Total muestra n=100			
Posición	1.8	2.8	3.8	4.8	1.8	2.8	3.8	4.8	1.8	2.8	3.8	4.8
Vertical	27	28	16	16	34	33	11	15	61	33	11	15
	62,8%	70%	41%	37,2%	81%	76,7%	25,6%	38,4%	%	76,7%	25,6%	38,4%
Mesio angulado	10	5	16	21	4	3	20	19	14	3	20	19
	23,3%	12,5%	41%	48,8%	9,5%	7%	46,5%	48,7%	%	7%	46,5%	48,7%
Disto angulado	6	7	1	0	4	7	3	1	10	7	3	1
	13,9%	16,3%	2,6%		9,5%	16,3%	7%	2,6%	%	16,3%	7%	2,6%
Horizontal			4	1		8	4				8	4
			10,3%	2,4%		18,6%	10,3%				18,6%	10,3%
Vestíbulo lingual			2	5		1	0				1	0
			5,1%	11,6%		2,3%					2,3%	

Tabla V. Erupción, agenesia y retención de terceros molares. Mujeres, hombres y total de muestra de jóvenes de 17-20 años de edad, Antofagasta, Chile (n=100). 1)  $p < 0,185428$ , sin diferencia estadística significativa al 95% entre retención de terceros molares entre ambas arcadas en mujeres. 2)  $p < 0,825991$ , sin diferencia estadística significativa al 95% entre retención de terceros molares entre ambas arcadas en hombres. 3)  $p < 0,742905$ , sin diferencia estadística significativa al 95% entre retención de terceros molares entre ambas arcadas en la totalidad de la muestra. 4)  $p < 0,000123822$ , con diferencia estadística significativa al 95% entre terceros molares erupcionados y retenidos en la totalidad de la muestra.

Nivel de posición eruptiva del tercer molar. Clasificación de Pell-Gregory	Mujeres n=165 terceros molares		Hombres n=167 terceros molares		Totalidad Muestra n=332 terceros molares		Total de terceros molares n=332
	Maxila n=83	Mandíbula n=82	Maxila n=85	Mandíbula N=82	Maxila n=168	Mandíbula n=164	
Erupcionado (nivel A)	17/83=20,5%	17/82=20,7%	22/85=25,9%	21/82=25,6%	39/168=23,2%	37/164=22,5%	76/332 22,9% <sup>1</sup>
Semirretenido (nivel B)	22/83=26,5%	30/82=36,6%	23/85=27,0%	21/82=25,6%	45/168=26,8%	48/164=29,3%	93/332 28%
Retención (nivel C)	44/83=53,0% <sup>1</sup>	35/82=42,7% <sup>1</sup>	40/85=47,1% <sup>2</sup>	40/82=48,8% <sup>2</sup>	84/168=50,0% <sup>3</sup>	79/164=48,2% <sup>3</sup>	163/332 49,1% <sup>4</sup>
<b>Total</b>	83=100%	82=100%	85=100%	82=100%	168=100%	164=100%	332 100%
Agenesia	17/100=17%	18/100=18%	15/100=15%	18/100=18%	32/200=16%	36/200=18%	

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Tabla VI. Clasificación de Winter de terceros molares retenidos. Mujeres, hombres y total de muestra, de jóvenes de 17-20 años de edad, Antofagasta, Chile (n=100).

Clasificación Winter	Mujeres n=83 molares retenidos				Hombres n=80 molares retenidos				Total muestra n=163 molares retenidos			
	1.8 n=24	2.8 n=20	3.8 n=18	4.8 n=21	1.8 N=22	2.8 n=18	3.8 n=22	4.8 n=18	1.8 N=46	2.8 n=38	3.8 n=40	4.8 n=39
Posición												
Vertical	10 41,7%	10 50,0%	1 5,6%	1 4,8%	17 77,3%	13 72,2%	1 4,5%	0	27 58,7%	23 60,5%	2 5,0%	1 2,5%
Mesio angulado	9 37,5%	3 15,0%	11 61,1%	15 71,4%	3 13,6%	2 11,1%	12 54,6%	14 77,8%	12 26,1%	5 13,2%	23 57,5%	29 74,4%
Disto angulado	5 20,8%	7 35,0%	0	0	2 9,1%	3 16,7%	0	0	7 15,2%	10 26,3%	0	0
Horizontal			4 22,2%	1 4,8%			8 36,4%	4 22,2%			12 30,0%	5 12,8%
Vestíbulo lingual			2 11,1%	4 19,0%			1 4,5%	0			3 7,5%	4 10,3%

Tabla VII. Clasificación de Winter de terceros molares retenidos por arcada. Mujeres, hombres y total de muestra, de jóvenes de 17-20 años de edad, Antofagasta, Chile (n=100). (1)  $p < 1,02141E-14$ , con diferencia estadística significativa al 95% entre terceros molares retenidos en la maxila en posición vertical respecto retención vertical en mandíbula para la totalidad de la muestra. (2)  $p < 2,61306E-9$  con diferencia estadística significativa al 95% entre terceros molares retenidos en la mandíbula en posición mesioangulada respecto de retención mesioangulada en maxila para la totalidad de la muestra. (3)  $p < 0,00000412757$ , con diferencia estadística significativa al 95% entre terceros molares retenidos en la mandíbula en posición mesio angulada respecto de las otras posiciones de retención en el género femenino. (4)  $p < 0,0017221$ , con diferencia estadística significativa al 95% entre terceros molares retenidos en la mandíbula en posición mesio angulada respecto de las otras posiciones de retención en el género masculino.

Clasificación Winter	Mujeres n=83 molares retenidos				Hombres n=80 molares retenidos				Total muestra n=163 molares retenidos			
	1.8 n=24	2.8 n=20	3.8 n=18	4.8 n=21	1.8 N=22	2.8 n=18	3.8 n=22	4.8 n=18	1.8 N=46	2.8 n=38	3.8 n=40	4.8 n=39
Posición												
Vertical	10 41,7%	10 50,0%	1 5,6%	1 4,8%	17 77,3%	13 72,2%	1 4,5%	0	27 58,7%	23 60,5%	2 5,0%	1 2,5%
Mesio angulado	9 37,5%	3 15,0%	11 61,1%	15 71,4%	3 13,6%	2 11,1%	12 54,6%	14 77,8%	12 26,1%	5 13,2%	23 57,5%	29 74,4%
Disto angulado	5 20,8%	7 35,0%	0	0	2 9,1%	3 16,7%	0	0	7 15,2%	10 26,3%	0	0
Horizontal			4 22,2%	1 4,8%			8 36,4%	4 22,2%			12 30,0%	5 12,8%
Vestíbulo lingual			2 11,1%	4 19,0%			1 4,5%	0			3 7,5%	4 10,3%

## Relatório Final de Estágio

Tabla VIII. Porcentaje de posición de terceros molares retenidos obtenidos por diversos autores según, la Clasificación de Winter y comparación  $p < 0,05$  respecto del porcentaje de retención determinado en la investigación (49,1%).

Investigador	Edad Rango	V %	MA %	DA %	H y otras %	n° 3M	n° casos	Retención %	p<0,05
García <i>et al.</i> , 2009	18,6 17-20	32,5	42,3	10,4	14,7	332	100	49,1 (total)	
Nicodemo <i>et al.</i> , 1982		44,5 max 44,5 mand	52,0 max 56,2 mand					50 ma-48,2 md 40,0 (total)	
Martínez <i>et al.</i> , 1995	22,3 18-25	40,3	50,6	4,3	4,8	186	116	37,6 mand	0,01160 14
Hattab <i>et al.</i> , 1995	20,4	41,0	50,0			844	232	26,6 (total)	1,49214 E-13
Hattab, 1997	19,7 18,6-20,8					67 mand	36	46,0 mand	0,76125 8
Hattab <i>et al.</i> , 1999	19,8 18,5- 20,8					213 mand	134	17,4 mand	1,35137 E-10
Punwutikorn, <i>et al.</i> , 1999	13-69	26,9	39,9	13,0	20,2	1151		16,7 mand	0,0
Kruger <i>et al.</i> , 2001	18	18,1 max 11,9 mand	29,3 max 62,9 mand	12,2 max 1,4 mand	0,0 max 1,0 mand	1374 max 1278 mand	821		
Renton <i>et al.</i> , 2001		28,0	37,0	22,0	13,0	354 mand	354		
Qoeck <i>et al.</i> , 2003	26,5	9,5	59,5	9,8	21,2 H=18,8	2281	686	15,0 (total) 39 max - 9 md	0,0 0,0206 - 0,0 0,0
Susarla & Dodson, 2004	26,2 15-65	68,4	20,0	6,8	4,8	250	82	15,0 (total)	0,0
Sandhu & Kaur, 2005	19,3 17,5-20	43,0 max 42,0 mand	9,0 max 49,0 mand	48,0 max 9,0 mand		354	100	34,0 (total) 59 max-10 md	0,00004 169
Susarla & Dodson, 2005 <sup>a</sup>	26,6 15-65	64,0	22,8	8,4	4,8	450	150	15,0 (total)	0,0
Susarla & Dodson, 2005 <sup>b</sup>	25,6 14-65	61,6	24,0	9,8	4,7	253	150	15,6 (total)	0,0
Chaparro <i>et al.</i> , 2005	12-18	80,0 max 27,0 mand	13,3 max 71,5 mand	6,7 max 1,5 mand		120 270	173	75,0 max 46,7 mand	0,00001 894 0,55774 9
Mateos <i>et al.</i> , 2005	30,76 17-72	31,13	49,28	7,69	11,90	279/5730 1118/573 0	2865	4,9 max 19,5 mand	0,0 0,0
Llerena & Arrascue, 2006	24 15-56	29,0	55,0	9,0	7,0	100 mand		5,0 mand	2,70894 E-13
Nicodemo <i>et al.</i> , 2007	18-35	59,5	35,1	5,4	2,0	164	41	46,0 (total)	0,70791 3
Rodríguez, <i>et al.</i> , 2007	20,6- 21,2 11-72	43,9	40,8	6,1	9,2	2120	1072	41,6 (total)	0,00018 31
Cienfuegos <i>et al.</i> , 2008	29,8	45,27	24,88	15,42	14,43	201	115	43,7	0,21878 9

## DISCUSIÓN

La muestra consistió en 100 individuos (50 mujeres y 50 hombres) con rangos de edad entre 17 y 20 años y con una edad promedio de 18 años y 6 meses (Tabla I).

En el grupo en estudio se determinó un 32% de casos con agenesia de uno o más 3Ms (Tabla V), porcentaje más alto que los obtenidos por el autor y colaboradores en otros trabajos realizados en el Norte de Chile, pero sin diferencia estadística significativa al 95% (García-Hernández & Beltrán, 2008=26,7%  $p < 0,423741$ ; García-Hernández *et al.*, 2008=24,75%  $p < 0,140292$ ; García-Hernández & Beltrán, 2009=21,79%  $p < 0,130225$ ; García-Hernández & Araneda, 2009=20,0%  $p < 0,0530541$ ).

La formación dentaria, según clasificación de Nolla, muestra un promedio de 9,05 DS 1,3 para 3Ms superiores y 8,75 DS 1,5 para los 3Ms inferiores, lo que demuestra una formación radicular más completa a nivel de maxilares, ratificando lo descrito en la literatura para la edad del grupo en estudio.

El porcentaje obtenido de retención del 3M fue de 49,1%, con diferencia estadística significativa al 95% respecto de 3Ms erupcionados o semierupcionados (Tablas III, V y VIII), detectando similitud de porcentajes con investigadores latino americanos. Pese a no existir diferencias estadísticas significativas entre arcadas de individuos del mismo género, así como entre mujeres y hombres, predomina la retención maxilar en el género femenino (53,0%) y en toda la muestra (50,0%). Al analizar la relación del 3M con la rama mandibular, se detecta 25% de cordales de Clase III.

Respecto a la clasificación de Winter (ver Tablas IV, VI. y VII), en la muestra total predomina la impactación mesioangulada (42,3%) coincidente con la mayoría de los resultados revisados en la literatura (Tabla VIII). Los 3Ms maxilares retenidos presentan un 59,6% de retención vertical, con diferencia estadística significativa al 95% ( $p < 1,02141E-14$ ) respecto de retención vertical mandibular. En la mandíbula, para toda la muestra se aprecia un porcentaje de 65,8% de dientes mesioangulados con un diferencia estadística significativa al 95% respecto de la posición mesioangulada en maxila ( $p < 2,61306E-9$ ), con similares resultados en mujeres con un 66,7% ( $p < 0,000323695$ ) y en hombres con un 65,0% ( $p < 0,0000144241$ ).

La Tabla VIII permite comparar nuestros resultados con porcentajes de retención y posición determinados por diversos autores, calculándose  $p < 0,05$  para significancia estadística, siempre y cuando se tuviese acceso a los datos necesarios para poder realizar la comparación estadística.

El análisis comparativo de la Tabla VIII, establece que existen estudios que coinciden con nuestros resultados y sin diferencia estadística de significancia al 95% (retención total: Nicodemo Filho et al., 2007; Cienfuegos et al., 2008; en mandíbula Hattab, 1997). En cambio, se muestran diferencias estadísticas significativas al 95% en relación a nuestros resultados de retención total: Queck et al. (2003); Sandhu & Kaur; Susarla & Dodson (2004); Susarla & Dodson (2005); Rodríguez et al. (2007); en maxila: Chaparro-Avenidaño et al.; Queck et al.; Mateos & Hernández (2005) y en mandíbula Hattab et al. (1995); Llerena & Arrascue (2006); Martínez et al.; Queck et al. y Mateos & Hernández.

La retención en posición disto angulada predomina en forma significativa en 3Ms maxilares respecto de 3Ms mandibulares ( $p < 0,0000243969$ ). Esta posición de retención es considerada por varios autores como predisponente a complicaciones operatorias y postoperatorias en la exodoncia del 3M.

La retención horizontal se aprecia sólo a nivel mandibular correspondiendo al segundo tipo de retención con alto porcentaje de casos (21,5% en toda la muestra; 12,8% en mujeres y 30% en hombres). Algunos 3Ms en posición horizontal tenían las cúspides distales semierupcionadas (posición B de Pell-Gregory) y producto del impacto distal al 2M que impide cualquier posibilidad de erupción normal, estos dientes fueron clasificados como retenidos (posición C de Pell-Gregory). Los 3Ms retenidos en posición vestibulolingual, o a la inversa, se visualizan solamente en mandíbula (8,9% de los casos) y para el análisis estadístico fueron agrupados con la posición horizontal y otras.

## CONCLUSIONES

Se determinó un 32% de agenesia en la muestra de jóvenes entre 17-20 años de edad, con presencia de 332 3Ms con formación dentaria tipo 9 de Nolla para 3Ms superiores y entre 8-9 para 3Ms mandibulares.

La retención total fue de 49,1% con diferencia estadística significativa al 95% respecto de dientes erupcionados o semierupcionados, sin diferencias entre ambas arcadas según género y también entre hombres y mujeres. Se determinó un 25% de 3Ms Clase III respecto de la rama mandibular. La literatura muestra variedad de resultados comparativos, con y sin significancia estadística ( $p < 0,05$ ), en relación a nuestros datos de retención.

Coincidente con la literatura predominó la retención mesioangulada, a continuación la posición vertical y finalmente, posiciones distoangulada y horizontal con porcentajes similares. En la retención maxilar predominó la posición vertical mientras que en la retención mandibular prevaleció la posición mesio angulada, comprobándose significativos porcentajes de retención horizontal y vestíbulo lingual o viceversa, tanto en la totalidad de la muestra como en ambos géneros. La retención disto angulada se produjo a nivel maxilar y fue considerada como predisponente para producir complicaciones postoperatorias.

De acuerdo al alto porcentaje de retención determinado en el grupo etéreo y teniendo en cuenta los costos clínicos, ausencias laborales y las complicaciones postquirúrgicas que acarrearán las exodoncias profiláctica o preventiva de 3Ms, creemos conveniente sugerir a los cirujanos retardar el mayor tiempo posible los procedimientos quirúrgicos con fines profilácticos, pensando en la probabilidad que se produzca la erupción tardía, lo cual fue demostrado por Hattab, Ventä et al. (1999, 2004) y Kruger et al. (2001) quienes realizaron estudios longitudinales, observando disminución significativa de retención producto de erupciones durante el tiempo en que duró la investigación. Nuestra propuesta es avalada por el meta-análisis realizado por Haug et al. (2005) en 3760 pacientes de 25 años o mayores a los cuales se les realizó exodoncia quirúrgica del 3M y que detallan escasa morbilidad, con baja incidencia de complicaciones y mínimo impacto en la calidad de vida del paciente

## **AGRADECIMIENTOS**

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**Resumen:** El tercer molar es el diente que con mayor frecuencia no finaliza su proceso normal de erupción, siendo la retención del mismo una afección muy común en la generación actual.

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## RESUMEN

El tercer molar es el diente que con mayor frecuencia no finaliza su proceso normal de erupción, siendo la retención del mismo una afección muy común en la generación actual. Motivados por su alta frecuencia en nuestro quehacer diario y entusiasmado además en conocer estadísticas sobre la prevalencia de los terceros molares retenidos en la población de Ibb, República de Yemen, decidimos hacer esta investigación tomando como muestra 408 estudiantes de la Universidad de Ibb que se encuestaron al azar, cuyas edades oscilaron entre 18 y 25 años.

Para la recolección de la información se utilizó una encuesta de salud bucodental confeccionada al efecto y posteriormente la misma fue vaciada en tablas, porcentos y gráficos para el correspondiente análisis de las mismas. Como resultado obtuvimos una prevalencia de terceros molares retenidos de un 54,7%. El sexo femenino exhibió la mayor prevalencia de terceros molares retenidos con un 65,7%. Por maxilares, la mandíbula mostro una mayor frecuencia de retención con un 59,8%.

## INTRODUCCIÓN

Se denominan dientes retenidos o impactados a aquellos que una vez llegada la época normal de su erupción, quedan encerrados dentro de los maxilares manteniendo la integridad de su saco pericoronario fisiológico. El término de diente incluido o impactado, en la literatura anglosajona se utiliza profusamente, para todo diente que presente cierta anomalía en su posición o situación que le impide erupcionar normalmente (1,2,3,4,5,6). La etiología de los dientes retenidos es multifactorial, atribuyéndose a ello causas locales y sistémicas.

Entre las causas locales más comunes de retención dentaria algunos autores mencionan la obstrucción mecánica por la presencia de supernumerarios, tumores o quistes; inadecuado espacio en el arco dental (micrognatia); pérdida prematura de dientes temporales o discrepancia diente – espacio, etc. Entre las causas sistémicas la predisposición genética, los trastornos endocrinometabólicos y la radioterapia de los maxilares son las más comunes. En algunas enfermedades congénitas y síndromes craneofaciales encontramos con cierta frecuencia múltiples dientes retenidos sin embargo la causa específica se mantiene desconocida (7, 8, 9, 10).

La literatura señala que la retención dentaria es un fenómeno frecuente sin embargo existe considerable variación en la prevalencia y distribución de los dientes retenidos en las diferentes regiones de los maxilares (11,12), constituyendo los terceros molares y los caninos superiores los dientes que con mayor frecuencia quedan retenidos, presentándose con mayor frecuencia en la población adolescente y adultos jóvenes sin tener preferencia por sexo ni tipo racial (13,14,15,16,17).

La retención dentaria puede presentarse de dos formas: intraósea cuando el diente está totalmente rodeado por tejido óseo, y subgingival cuando está cubierto por mucosa gingival, pudiendo encontrarse en diferentes lugares de la cavidad bucal.

Los terceros molares han recibido diversas clasificaciones de acuerdo a la posición del eje longitudinal del diente, a la altura respecto al plano de oclusión, a la profundidad, entre otras (18). El tercer molar es el diente que con mayor frecuencia no finaliza su proceso normal de erupción, provocando innumerables complicaciones desde el punto de vista clínico (19); la retención de los mismos es una afección muy común en la generación actual. Los terceros molares inferiores retenidos pueden permanecer asintomáticos (20,21) o pueden ocasionar diversos accidentes y complicaciones de muy diversos tipos en el proceso de brote dentario. Su

diagnóstico conlleva un examen clínico y radiográfico y su tratamiento por lo general es quirúrgico o quirúrgico-ortodóncico (22,23).

Algunos autores plantean que la evidencia científica de trabajos realizados indican una mayor incidencia de terceros molares en posición mesioangular, lo cual contribuye a la presencia de lesiones como caries, pérdida de hueso alveolar y del tejido del diente adyacente, abogando por tanto por su eliminación (24,25).

Motivados por alta frecuencia en nuestro quehacer diario y entusiasmado además en conocer estadísticas sobre la prevalencia de los terceros molares retenidos en la población de Ibb, República de Yemen, decidimos hacer esta investigación precisando además el comportamiento según el sexo y maxilar más afectado.

## **DESARROLLO**

### **MATERIAL Y MÉTODO:**

Se realizó un estudio descriptivo y transversal sobre la prevalencia de los terceros molares retenidos en un grupo de estudiantes yemenitas que asistieron a la Facultad de Estomatología de la Universidad de IBB por otras causas, durante el período comprendido entre enero y Junio del 2007. La muestra utilizada fue de 408 pacientes con un rango de edad entre 18 y 25 años. Para la recolección de información se utilizó una encuesta de salud bucodental confeccionada al efecto y posteriormente la misma fue vaciada en tablas, porcentos y gráficos para el correspondiente análisis de las mismas. El examen clínico fue realizado por 15 estudiantes del 5to año de la carrera de Estomatología de la Universidad de Ibb supervisados por los autores, empleándose para el mismo el espejo bucal. Como método auxiliar de diagnóstico se utilizó la radiografía periapical.

### **RESULTADOS:**

En el gráfico No 1 podemos apreciar la prevalencia de los terceros molares retenidos encontrada en la investigación que fue de un 54,7%.

El gráfico No 2 expresa la relación de examinados por sexo y la cantidad de terceros molares retenidos con sus respectivos porcentos encontrados en nuestro estudio. Se aprecia que el sexo femenino fue el predominante con un total de 155 terceros molares retenidos, válidos para un 57,1%.

El gráfico No 3 representa la prevalencia de retención de los terceros molares en el Maxilar y la Mandíbula, observándose que hay amplio predominio en la retención de terceros molares inferiores con un 59,8%. La retención de los terceros molares maxilares fue de 40,2%.

### **DISCUSIÓN:**

En nuestra investigación, la prevalencia de terceros molares retenidos encontrada en los 408 examinados fue 54,7% (Gráfico No. 1). Este resultado es muy similar al encontrado por otros autores. Cabreja Hernández y colaboradores quienes encuestaron a 130 estudiantes de la Facultad de Estomatología del ISCM de La Habana, obtuvieron una prevalencia de terceros molares retenidos mayor al 50%, siendo los terceros molares mandibulares los de mayor tasa de retención (26). De igual modo, Rodríguez Calzadilla obtuvo como resultado en su estudio de 1006 pacientes tratados quirúrgicamente en Güines, La Habana, que el 50,89% correspondió a retenciones dentarias, con mayor frecuencia de los terceros molares (27). Morris and Jerman reportaron en su trabajo que el 65,5% de los varones entre 17 y 24 años, presentaron por lo menos un tercer molar retenido (28).

Algunos autores plantean que en la actualidad el incremento en la prevalencia de terceros molares retenidos se debe a la tendencia cada vez mayor de consumir una dieta más suave (29).

En nuestro trabajo, el sexo femenino fue el más afectado. De 268 examinadas, 155 presentaron terceros molares retenidos lo cual dio una prevalencia de retención de un 57,8% (Gráfico No 2). En este sentido, nuestro estudio no coincidió con el realizado por Scherstén y colaboradores quienes no encontraron diferencia significativa en la prevalencia de los terceros molares retenidos entre los dos sexos (30).

En relación a la prevalencia de terceros molares retenidos por maxilares (Gráfico No. 3), en nuestra muestra encontramos una mayor prevalencia en la Mandíbula (59,8%) que en el Maxilar (40,2%) coincidiendo con los resultados de Cabreja Hernández y colaboradores (26) así como el de Rodríguez Calzadilla (27). En este sentido también coincidimos en este resultado con Pérez López y colaboradores en su estudio de intervenciones quirúrgicas realizado a 155 pacientes con dientes retenidos en el Norte de Ciego de Ávila. Ellos en su investigación encontraron que aproximadamente la mitad de los dientes retenidos operados correspondían a terceros molares mandibulares (31).

Scherstén y colaboradores también encontraron en su investigación una mayor frecuencia de retención de terceros molares mandibulares (30). De igual modo, Hugoson y colaboradores encontraron en su estudio que más del 72% de la población sueca que fue utilizada como muestra, tienen por lo menos un tercer molar inferior retenido (31). En este sentido, Quek et al, encontraron en su trabajo realizado en la población china de Singapur, que los terceros molares mandibulares exhibían una tasa de retención tres veces más alta que los terceros molares maxilares (32). Muy interesante resulta el reporte de Aitasalo y colaboradores.

Ellos en su estudio realizado a la población finlandesa obtuvieron una alta prevalencia de terceros molares retenidos en general (76,1%) sin embargo no encontraron una diferencia significativa en la prevalencia de los terceros molares superiores e inferiores retenidos (33). Por otro lado, Dachi y Howell examinaron 1685 radiografías de estudiantes de la Universidad de Oregón, Estados Unidos, encontrando en su investigación un resultado totalmente opuesto al nuestro. Ellos obtuvieron una mayor prevalencia en los terceros molares maxilares (63,7%) que en los mandibulares (34). Resultado de forma similar fue alcanzado por Borjk y colaboradores quienes encontraron en su trabajo un predominio en la retención de los terceros molares maxilares (35).

### **CONCLUSIONES**

1. La prevalencia de los terceros molares retenidos en nuestro trabajo fue de 54,7%.
2. El sexo femenino con 155 muchachas afectadas por terceros molares retenidos fue el más prevalente en nuestro estudio con un 57,8%.
3. Los terceros molares mandibulares retenidos con un 59,8% exhibieron una mayor prevalencia en nuestra investigación.

### **TABLAS Y GRÁFICOS:**

Gráfico No 3: Relación de terceros molares retenidos en Maxilar y Mandíbula, Facultad de Estomatología de Ibb, República de Yemen, Enero – Junio 2007.

### 3.7.1. 3er molar mandibular / Mandibular third molar

Stefani de Podskubka, Laura.

*Rev Ateneo Argent Odontol*; 42(2): 32-37, ago.-dic. 2003. *ilus*

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#### 3.7.1.1 Resumen

Una de las inquietudes de los odontólogos, principalmente de los especialistas en ortodoncia y cirugía ora, es saber cuando es necesario extraer los terceros molares o cuando dejarlos para que erupcionen completamente con éxito. Este artículo hace una revisión de los distintos métodos para predecir la impactación o no, del tercer molar mandibular, sobre radiografías panorámicas para que nos permita tomar la decisión correcta (AU)

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**Título:** Exodoncia del tercer molar mandibular retenido en posición vertical /  
Extraction of the impacted mandibular third molar in vertical position

**Fonte:** *Rev. ADM = ADM*;50(2):101-6, mar.-abr. 1993. *ilus*.

**Idioma:** es.

**Resumo:** La remoción del tercer molar mandibular retenido en posición vertical puede ser una de las intervenciones más difíciles en cirugía bucal. La historia clínica proporciona información útil que permitirá evaluar racionalmente múltiples factores locales y generales que influyen en el comportamiento y la tolerancia de los pacientes durante el tratamiento quirúrgico. Los apoyos exodónticos apropiados alrededor del molar retenido son de importancia crítica. El uso adecuado del fórceps 222 y de los elevadores reducen la duración del tratamiento y el trauma quirúrgico (AU)

**Descritores:** [Dente Serotino/patologia](#)  
[Dente Impactado/cirurgia](#)  
[Extração Dentária/métodos](#)

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PRESENTACIÓN DE CASOS

**Desplazamiento accidental hacia el espacio parafaríngeo de un fragmento de un tercer molar inferior retenido**

**Accidental displacement of a fragment of a retained lower third molar towards the parapharyngeal space**

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**RESUMEN**

La extracción quirúrgica de los terceros molares retenidos es la operación realizada con más frecuencia por los cirujanos maxilofaciales, incluso de forma profiláctica, y se asocia con complicaciones trans y posoperatorias. Se presenta un caso con desplazamiento de un fragmento del tercer molar inferior izquierdo durante su exéresis quirúrgica hacia el espacio parafaríngeo, que resulta raro tanto por su frecuencia como por el tratamiento utilizado en esta complicación, pues se han reportado muy pocos casos en la literatura internacional y ninguno en nuestro país.

**Palabras clave:** Tercer molar/complicaciones; Tercer molar/tratamiento; espacio parafaríngeo.

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## ABSTRACT

The surgical removal of the retained third molars is the most common surgery performed by maxillofacial surgeons, even in a prophylactic way, and it is associated with trans- and postoperative complications. A case with displacement of a fragment of the left lower third molar towards the parapharyngeal space during its surgical exeresis is presented. It is a rare case due to its frequency and to the treatment used in this complication, since a few cases have been reported in international literature and none in our country.

**Key words:** Third molar/complications; third molar/treatment; parapharyngeal space.

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## INTRODUCCIÓN

La extracción quirúrgica de los terceros molares retenidos es la operación más frecuente en cirugía maxilofacial y su exéresis continúa siendo una práctica profiláctica universal. Algunos reportes estiman la remoción de terceros molares retenidos, sin justificación clínica, entre el 18 y el 50,7 %. La cirugía profiláctica preconiza la necesidad de minimizar el riesgo de desarrollo de quistes y tumores, de fractura a nivel del ángulo mandibular, pericoronaritis, reabsorción radicular del segundo molar y que el tercer molar no tiene un papel definido en la boca.<sup>1</sup>

Dentro de las complicaciones de esta cirugía se describen: dolor posoperatorio, inflamación, trastornos sensitivos por lesión del nervio lingual y/o alveolar inferior, trismo y osteítis alveolar.<sup>1,2</sup>

Otras complicaciones menos frecuentes son: el enfisema subcutáneo, retrofaríngeo y mediastinal, el neumotórax,<sup>3</sup> así como el desplazamiento accidental hacia diferentes espacio anatómicos.<sup>4-7</sup>

Se presenta un caso de desplazamiento de un fragmento del tercer molar inferior izquierdo durante su exéresis quirúrgica, el cual resulta raro por la baja frecuencia con que ocurre.

## PRESENTACIÓN DE CASO

Paciente femenina de 56 años de edad y antecedentes patológicos personales de asma bronquial e hipertensión arterial, que aproximadamente un año antes de acudir a la consulta de Cirugía Maxilofacial comenzó a presentar episodios de inflamación de zona retromolar inferior izquierda con ausencia

del tercer molar. Fue tratada con antibioticoterapia y termoterapia con mejoría de las manifestaciones clínicas y es remitida a la consulta de Cirugía para su valoración. Al examen físico se observó paciente dentada con ausencia clínica del 38 y ligero abultamiento de la cortical lingual de la zona retromolar a la palpación, acompañada de dolor. Se realizó radiografía periapical de la zona donde se observó imagen radiopaca compatible con diente retenido en posición vertical, intraóseo y lingualizado, confirmándose esta posición con una vista oclusal. Se decidió la exéresis quirúrgica del diente utilizando como vía la ostectomía lingual. El acto quirúrgico resultó trabajoso por la presencia del resto de los dientes y la posición en extremo profunda del tercer molar. Se realizó ostectomía lingual y odontosección, se luxan los fragmentos y al intentar realizar la exéresis de los mismos se produjo el desplazamiento del segundo fragmento hacia el espacio parafaríngeo izquierdo con imposibilidad de acceder al mismo desde la cavidad bucal. Durante el posoperatorio, dada la manipulación durante el acto quirúrgico, se produjo edema moderado, dolor y trismo, que resolvieron con tratamiento médico. Se realizó radiografía lateral de cráneo (fig. 1a) y ultrasonido de región laterosuperior izquierda de cuello (fig. 1b) para confirmar la ubicación del fragmento desplazado. La paciente mantuvo dolor en la zona del desplazamiento dentario el cual se intensificó, por lo que se decidió, luego de 6 meses de evolución, reintervenirla utilizando una vía de acceso externa (fig. 2a), con lo cual se logró la extracción del fragmento desplazado (fig. 2b).



Fig. 2b. Fragmento del tercer molar desplazado.

## DISCUSIÓN

En el caso presentado, la indicación de exéresis quirúrgica estuvo dada por los múltiples episodios inflamatorios de la zona retromolar inferior izquierda, pues a pesar de la ubicación intraósea del tercer molar, existía una comunicación con la cavidad bucal del saco coronario a través el espacio periodontal del segundo molar, y es, por lo tanto, la posición anatómica del diente quien hace necesario la odontosección, que dificulta la exéresis de los fragmentos y produce el desplazamiento de uno de ellos aún en ausencia de fuerzas excesivas.

Las consideraciones anatómicas como la posición del diente, el espesor de la cortical lingual, la aplicación de fuerzas incontroladas y un inadecuado estudio clínico y radiográfico, son factores que determinan el desplazamiento dentario.<sup>4</sup>

La incidencia de las complicaciones transoperatorias de los terceros molares en la mandíbula es del 1,1 %, y dentro de estas, su desplazamiento accidental se describe en los textos de cirugía oral, pero se reporta raramente.<sup>5,8</sup>

Aunque algunos autores <sup>4,5</sup> prefieren acceder al diente en el mismo momento en que se produce el desplazamiento, pues consideran que posponer la cirugía puede incrementar el riesgo de infección y reacción a cuerpo extraño, nosotros pensamos que someter a un paciente que lleva un tiempo prolongado en una fallida operación a un nuevo estrés quirúrgico, puede resultar poco prudente, y la espera de varias semanas facilitaría la inmovilización del diente por el tejido fibroso que lo rodea, ayudando esto a su exéresis.

Existen pocos casos de esta complicación reportados en la literatura debido a su baja frecuencia o quizás a que no se reporta; no obstante, es un accidente posible y de difícil manejo tanto para el paciente como para el cirujano.



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Basic and patient-oriented research

### Relationships Between Surgical Difficulty and Postoperative Pain in Lower Third Molar Extractions

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#### Purpose

To investigate the influence of surgical difficulty on postoperative pain after extraction of mandibular third molars.

#### Materials and Methods

A prospective study was performed of 139 patients who underwent a total of 157 mandibular third molar extractions. For evaluation of surgical difficulty, a 4-class scale was completed after surgery: I, extraction with forceps only; II, extraction requiring

osteotomy; III, extraction requiring osteotomy and coronal section; IV, complex extraction (root section). The duration of surgery was also recorded. Postoperative pain was evaluated using a visual analog scale that each patient completed daily until day 6 postsurgery, at which time the sutures were removed.

## Results

A statistically significant relationship was observed between surgical difficulty (as rated on the scale) and postoperative pain. Longer interventions generally produced more pain.

## Conclusions

Pain after extraction of a mandibular third molar increases with increased surgical difficulty and duration of the intervention.

Most studies of postoperative complications in the extraction of mandibular third molars have focused on the most serious complications, such as lesion of the inferior alveolar nerve.<sup>1, 2 and 3</sup> However, such complications are rare, and other, less serious but more frequent complications can have a significant impact on the patient's postoperative quality of life. Notably, lower third molar extractions invariably cause some amount of pain, inflammation, and trismus.<sup>4</sup>

Several previous studies have set out to identify factors associated with postoperative pain. Surgical difficulty, measured in different ways, has been reported to be one of the factors most closely related to postoperative pain.<sup>5, 6, 7, 8, 9, 10, 11 and 12</sup> Identifying factors determining pain after lower third molar extractions will help establish appropriate and individualized analgesic protocols. In line with this, the aim of the present study was to assess the affect of surgical difficulty and duration of surgery on postoperative pain after mandibular third molar extraction.

## Materials and Methods

### Patient Selection

Between January 2003 and June 2004, we performed a prospective study of a consecutive series of 139 patients who underwent a total of 157 mandibular third molar extractions. Bilateral extractions were required in 18 patients, but in all cases these extractions were carried out at different times. All patients were healthy, without serious medical alterations or blood dyscrasias. No patient had acute pericoronitis or severe periodontal disease at the time of surgery.

### Surgical Procedure

All interventions were performed by postgraduate students at the University of Santiago de Compostela. All surgeries were performed under local anesthesia by nerve-block anesthesia of the inferior alveolar nerve, lingual nerve, and buccal nerve with 2 1.8-mL capsules of 4% articaine with epinephrine 1:200.000 (Inibsa, Barcelona, Spain).

In cases where forceps proved insufficient, a muciperiosteal flap was raised, generally by an incision distal to the lower second molar along the length of the anterior border of the ascending ramus of the mandible, with another incision mesial to the same molar. Osteotomy, coronal section, or root section was then performed as required, and the wound was closed with 3/0 silk, with a piece of folded gauze applied to the wound to aid hemostasis. The sutures were removed 1 week later.

All patients received an antibiotic (amoxicillin, 500 mg every 8 hours for 7 days, starting the day before surgery), an anti-inflammatory/analgesic (ibuprofen, 600 mg every 8 hours for 4 days, starting after surgery), and an antiseptic (chlorhexidine 0.12%, 3 mouth rinses per day for 7 days, starting the day after surgery).

### Evaluation of Surgical Difficulty

Surgical difficulty was evaluated on the basis of duration of the intervention (from the start of the exodonty procedure to the final suture) and rating of difficulty on a 4-class scale: I, extraction requiring forceps only; II, extraction requiring osteotomy; III, extraction requiring osteotomy and coronal section; IV, complex extraction (root section).

### Evaluation of Postoperative Pain

Postoperative pain was evaluated using a visual analog scale (VAS)<sup>13</sup> that the patient completed at home every day after surgery (at approximately the same time of day as the operation) until day 6 postsurgery, at which time the sutures were removed. On the VAS, the leftmost end represented absence of pain (score 0); the rightmost end, the most severe pain imaginable (score 100).

### Statistical Analysis

The Kruskal-Wallis test was used to compare pain evaluations between the various surgical-difficulty groups. For paired comparisons, the Mann-Whitney *U* test with Bonferroni correction was used. Spearman's rank correlation was used to investigate relationships between continuous variables. *P* values less than .05 were considered to indicate statistical significance. All significance tests were 2-way tests. All analyses were done using SPSS for Windows (SPSS Inc, Chicago, IL).

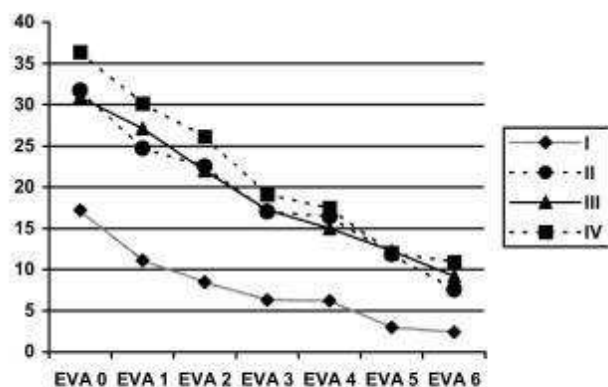
## Results

Of the 139 patients, 50 (36%) were men and 89 (64%) were women. Mean age ( $\pm$  standard deviation) was  $27.2 \pm 8.1$  years (range, 18 to 60 years). Lower third molar

extraction was required due to inflammatory pathology in 29.8% of cases and for prophylactic reasons in 41.7% of cases.

The most frequent surgical difficulty classes were III (32.5% of interventions, n = 51) and IV (30.6% of interventions, n = 48). The mean duration of surgery was  $36.8 \pm 22.8$  minutes.

Mean reported pain (as evaluated on the VAS) was highest on the day of surgery and subsequently declined steadily. As shown in [Figure 1](#), patients who underwent more difficult extractions tended to report more severe pain; mean pain evaluation was significantly higher in difficulty class IV than in difficulty class I on days 0 to 6 inclusive, significantly higher in class III than in class I on days 0 to 6 inclusive, and significantly higher in class II than class I on days 0 to 5 inclusive. No significant differences were observed between classes IV and III, IV and II, or III and II at any time in the study. In line with these findings, patients who underwent interventions of longer duration had significantly higher pain evaluations on days 0 ( $P = .019$ ), 5 ( $P = .041$ ), and 6 ( $P = .032$ ).



Surgical Difficulty Scale

*Postoperative Pain Evaluation*

	EVA 0	EVA 1	EVA 2	EVA 3	EVA 4	EVA 5	EVA 6
<b>I</b>	17.19* (21.71)	11.09* (18.42)	8.47* (16.62)	6.33* (14.20)	6.23* (17.01)	3.00* (9.08)	2.42* (7.37)
<b>II</b>	31.73 (22.72)	24.70 (22.58)	22.54 (22.14)	17.02 (19.40)	16.43 (20.89)	11.83 (16.13)	7.56 (13.92)
<b>III</b>	30.86 (24.73)	27.11 (26.35)	21.98 (23.31)	17.23 (20.18)	14.98 (18.50)	12.25 (17.12)	9.17 (15.48)
<b>III</b>	36.35 (25.38)	30.12 (20.57)	26.12 (20.98)	19.12 (18.18)	17.45 (16.58)	12.02 (13.73)	10.91 (15.52)
<b>Total</b>	30.91 (24.58)	25.32 (23.38)	21.57 (22.02)	16.30 (18.95)	14.91 (18.52)	10.84 (15.20)	8.42 (14.43)



Figure 1.

Mean pain ( $\pm$  standard deviation) evaluation daily until day 6 postsurgery in each category of the surgical difficulty scale.

Lago-Méndez et al. *Surgical Difficulty and Postoperative Pain. J Oral Maxillofac Surg* 2007.

Figure options

- Discussion

Pain, inflammation, and trismus are typically observed in the postoperative period after mandibular third molar extraction.<sup>4</sup> The sensation of pain is, of course, subjective, and there are no uniform criteria for its measurement. Pain sensation depends on each individual's subjective pain threshold, which may be influenced by diverse factors including age, gender, anxiety, and surgical difficulty.<sup>6, 14 and 15</sup> Diverse procedures and scales have been proposed for pain evaluation, including the semiquantitative verbal scale of Ohnhaus and Adler,<sup>16</sup> the McGill Pain Questionnaire of Melzack,<sup>17</sup> the VAS of Scott and Huskinsson,<sup>13</sup> and analgesic use.<sup>7 and 8</sup> For the present study, we selected the VAS, which is straightforward to apply and widely used.

Surgical difficulty likewise may be evaluated in diverse ways. Some previous studies have evaluated surgical difficulty in lower third molar extraction on the basis of surgical complications,<sup>15</sup> but difficulty generally has been evaluated on the basis of anatomical factors and the position of the molar as assessed on radiography. This has been reflected in the development of 3 systems based on dental factors: the lines system of Winter,<sup>18</sup> the Pell and Gregory classification system,<sup>19</sup> and the WHARFE system of MacGregor.<sup>20</sup> More recently, Yuasa et al<sup>11</sup> proposed a new index taking root anatomy into account. However, some authors believe that surgical difficulty cannot be reliably estimated before surgery on the basis of radiographs but rather must be determined during surgery.<sup>21</sup> In our opinion, surgical difficulty is best measured after surgery, and in the present study we used a 4-class scale for postoperative evaluation and also recorded the duration of surgery. It has also been suggested that patient factors (notably age, gender, and race) can have a major impact on surgical difficulty in lower third molar extractions.<sup>15, 22 and 23</sup>

Our results indicate that pain as evaluated using the VAS was most severe on the day of surgery, as expected and in line with previous studies.<sup>7, 24, 25 and 26</sup> For example, Fisher et al<sup>26</sup> found that 97% of their patients reported more severe pain on the first day. In the present study, pain subsequently declined steadily until postoperative day 7, when the sutures were removed. As in other studies,<sup>5</sup> the most severe pain occurred during the first 3 days. Chapián<sup>27</sup> reported that pain continued for at least 2 days. Other studies have found that pain reaches its maximum intensity during the first 8 hours after surgery, attributable to increased production of pain mediators and to the declining effect of the local anesthetic.<sup>28, 29 and 30</sup> The differing results obtained in various studies may reflect differences in the type of anesthetic used and in the analgesics administered after surgery. An ideal study design would involve elimination of postoperative analgesics, but of course this is not possible for ethical reasons. Other factors that may affect pain include the surgeon's experience,<sup>15</sup> history of pericoronitis,<sup>26</sup> poor oral hygiene,<sup>31</sup> and contraceptive use.<sup>32</sup> The main difference between the present study and previous studies

is in the surgeon's experience; all surgeons in the present study were postgraduate students in training, without significant surgical experience. This is reflected in the long durations of surgery and should be taken into account in our assessment of the relationship between surgical difficulty and postoperative pain.

Surgical difficulty as evaluated on our 4-class scale was positively correlated with postoperative pain. This finding was as expected, because tissue damage is generally more extensive and more severe at each increasing level of surgical difficulty, and pain is due principally to tissue damage.<sup>31</sup> Similar results have been obtained in many previous studies.<sup>5, 9, 33, 34 and 35</sup> In contrast, however, other studies<sup>25, 30 and 36</sup> have found that the severity of postextraction pain can vary from patient to patient and does not appear to be related to surgical difficulty or the degree of tissue damage.

In the present study, the relationship between surgical difficulty and pain was observed from difficulty class II (requiring the raising of a mucoperiosteal flap) onward. We have reported the affect of this procedure on postoperative pain in a previous study,<sup>8</sup> although in that study pain was evaluated on the basis of self-reported analgesic use. Another previous study likewise evaluated the affect of raising a mucoperiosteal flap on postoperative pain in patients subjected to bilateral extraction of mandibular third molars, comparing the side on which the flap was raised with the contralateral side and finding more severe discomfort on the flap side.<sup>32</sup> In the present study, the difference in pain evaluations between difficulty class II and difficulty classes III and IV was not very marked, although some previous studies have found more severe pain in more complicated interventions, in which traction by the mucoperiosteal flap is more severe.<sup>5</sup>

Yuasa and Sugiura<sup>37</sup> likewise reported a relationship between surgical difficulty and pain; however, they evaluated the difficulty before the surgery. As noted earlier, the present study—like that of Berge and Boe<sup>6</sup>—evaluated surgical difficulty after the surgery, which is probably a more accurate approach (although, of course, for clinical purposes, predicting the difficulty before the surgery is more useful).

The relationship observed between duration of surgery and postoperative pain was statistically significant only on day 1 postsurgery, when pain was most severe. Despite the limited experience of the trainee surgeons in the present study, these results are similar to those obtained in previous studies, which likewise reported a relationship of this type.<sup>4, 5, 38 and 39</sup> Oikarinen<sup>5</sup> reported a statistically significant difference in pain evaluations depending on the duration of surgery. In the present study, a relationship was observed

on days 4, 5, and 6 postsurgery, implying slower recovery for interventions of longer duration. Pedersen<sup>4</sup> recorded analgesic consumption over the first 48 hours postsurgery and found a significant correlation between duration of surgery and postoperative pain. However, other authors have not found an association between severity of pain and duration of surgery,<sup>25, 26 and 40</sup> and some have not found any relationship between severity of pain and degree of surgical trauma.<sup>25 and 34</sup>

In conclusion, longer interventions are typically associated with more pain. Likewise, pain increases with increasing difficulty of surgery, notably in operations requiring the raising of a mucoperiosteal flap. In the present study, the surgical difficulty was evaluated after the surgery, but for clinical purposes, both presurgical and postsurgical evaluation are required for optimal analgesic management. Furthermore, it should be kept in mind that pain after third molar extraction also depends on other factors, such as smoking, oral hygiene, and history of pericoronitis.



#### 4. The Prophylactic Extraction of Third Molars: A Public Health Hazard

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##### 4.1. Abstract

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Ten million third molars (wisdom teeth) are extracted from approximately 5 million people in the United States each year at an annual cost of over \$3 billion.

In addition, more than 11 million patient days of “standard discomfort or disability”—pain, swelling, bruising, and malaise—result postoperatively, and more than 11000 people suffer permanent paresthesia—numbness of the lip, tongue, and cheek—as a consequence of nerve injury during the surgery. At least two thirds of these extractions, associated costs, and injuries are unnecessary, constituting a silent epidemic of iatrogenic injury that afflicts tens of thousands of people with lifelong discomfort and disability.

Avoidance of prophylactic extraction of third molars can prevent this public health hazard.

**IN THE UNITED STATES**, prophylactic removal of third molars (wisdom teeth) is advocated by almost all oral and maxillofacial surgeons and many general dentists. According to the American Association of Oral and Maxillofacial Surgeons, “if there is insufficient anatomical space to accommodate normal eruption. . . removal of such teeth at an early age is a valid and scientifically sound treatment rationale based on medical necessity.”<sup>1</sup> As a result, 10 million teeth classified as impactions (teeth that fail to erupt into normal position but remain fully or partially embedded and covered by jawbone or gum tissue) are removed every year from mostly healthy young people.<sup>2</sup>

There is no evidence of widespread third-molar infection and pathology or of medical necessity to justify so much surgery. In fact, 50% of upper third molars classified as impactions are normally developing teeth, most of which will erupt with minimal discomfort if not extracted prematurely. Only 12% of truly impacted teeth are associated with pathological conditions such as cysts and damage to adjacent teeth.<sup>3,4</sup> Most discomfort of erupting wisdom teeth is equivalent to teething and disappears on full eruption. Most infection of the gum tissue around the erupting or partially erupted teeth can be prevented by good oral hygiene, including toothbrushing. Infection occurs in fewer than 10% of third molars, most of which can be cured with antibiotics, oral rinsing, or removal of excess tissue (the hyperculum) around the tooth, without requiring removal of the tooth itself.<sup>5</sup> Most of the pain and illness attributed to third molars is caused by the surgery, not the teeth.

Third-molar surgery is a multibillion-dollar industry that generates significant income for the dental profession, particularly oral and maxillofacial surgeons. It is driven by

misinformation and myths that have been exposed before but that continue to be promulgated by the profession.<sup>6</sup>

Go to:

## 4.2. THE MYTHOLOGY OF WISDOM TEETH

### 4.2.1. Myth Number 1—Third Molars Have a High Incidence of Pathology

Not more than 12% of impacted teeth have associated pathology (Table 1 ►). This incidence is the same as for appendicitis (10%) and cholecystitis (12%), yet prophylactic appendectomies and cholecystectomies are not the standard of care.<sup>4</sup> Why then prophylactic third-molar extractions?

Pathology	Percentage Affected
Internal resorption	0.85
Cysts	1.60
Periodontal bone loss	4.72
Resorption on distal surface of second molar	4.78
Pericoronitis	8
Total	20

Source: See references 5, 7, and 8.

1

### Pathologies and Pericoronitis Associated With Impacted Third Molars

What about pericoronitis, the pain and infection of the gum tissue surrounding a partially erupted or erupted third molar? Excluding the normal discomfort of teething as the tooth erupts, the incidence of inflammation and infection of the gum tissue ranges from 6% to 10%.<sup>5,7,8</sup> Adding an average of 8% incidence of pericoronitis to the 12% pathology listed in Table 1 ► brings the maximum pathology associated with third molars to 20%. However, a single episode of pericoronitis is not a reason to remove a third molar; this should be considered only if the problem fails to respond to conservative treatment or recurs.<sup>9</sup>

Many dentists confuse the incidence of pathology as it shows up in their offices with its prevalence in the population. Advocacy of prophylactic extractions that is based on anecdotal experience (i.e., patients with diseased third molars who make dental appointments) exaggerates the problem and exposes millions of people to the risk of iatrogenic injury. Considering the low prevalence of third-molar pathology in the population, removal of asymptomatic, nonpathologic third molars does not meet the standard of evidence-based practice.

### 4.2.2. Myth Number 2—Early Removal of Third Molars Is Less Traumatic

The American Association of Oral and Maxillofacial Surgeons states that “about 85% of third molars will eventually need to be removed.”<sup>10(p3)</sup> The association recommends extraction of all 4 third molars by young adulthood—preferably in adolescence, before the roots are fully formed—to minimize complications such as postextraction pain and infection.

Early removal of third molars is actually more traumatic and painful than leaving asymptomatic, nonpathologic teeth in situ. Tulloch et al. estimate that patients suffer an average of 2.27 days of standard discomfort or disability, defined as “the disability normally associated with an uncomplicated surgical extraction of a mandibular third molar: namely, pain, swelling, bruising and malaise.” <sup>11</sup> (p507) Furthermore, dry socket, secondary infection, and paresthesia are less likely to occur in persons aged 35 to 83 years than in those aged 12 to 24 years, who experience more third-molar extractions. The highest risk of complication is in persons aged 25 to 34 years.<sup>7</sup>

When a lower third molar is removed, usually the opposing upper third molar is also removed. Assuming an average of 2 extractions per episode, the 10 million third molars extracted annually involve 5 million people and 11.36 million days of standard discomfort or disability (Table 2 ▶). If only the 20% of wisdom teeth with pathology were extracted, 4 million people would be spared pain, swelling, bruising, malaise, and consequent absence from school or work—an aggregate decrease of 9 million days of discomfort and disability each year. Allowing for some margin of error and for the fact that one third of third molars are reported to cause some symptoms in the past or present, if only 33% were extracted, 3.34 million people would still be spared an average of 2.27 days of discomfort and disability each, or 7.6 million days of discomfort and disability in the aggregate (Table 3 ▶).

3

**Estimated Third-Molar Extractions Per Year, by Doctor Performing Extraction: United States**

	No. of Extractions	Cost \$	No. of Patients	No. of Lower Third Molar Extractions	Patient Days of Standard Discomfort or Disability <sup>a</sup>
Oral and maxillofacial surgeons	1 000 000	2 800 000	5 000 000	5 000 000	7 900 000
General practitioners	3 000 000	400 000	1 500 000	1 500 000	3 410 000
Total	10 000 000	3 200 000	6 500 000	6 500 000	11 360 000

Source: See reference 2.  
a. Based on an average fee of \$500 for 1 upper and 1 lower third molar.

2

**Estimated Third-Molar Extractions Per Year, by Doctor Performing Extraction: United States**

3

**Estimated Annual Reduction of Cost and Disability From Performing Only Needed Third-Molar Extractions: United States**

	No. of Extractions	Cost \$	Savings \$ <sup>a</sup>	No. of Patients	Patient Days of Standard Discomfort or Disability	Reduction of Patient Days of Standard Discomfort or Disability
Oral and maxillofacial surgeons	2 910 000	841 000	1 915 000	1 190 000	2 900 000	5 900 000
General practitioners	1 090 000	150 000	250 000	540 000	1 130 000	2 280 000

3

**Estimated Annual Reduction of Cost and Disability From Performing Only Needed Third-Molar Extractions: United States**

#### **4.2.3. Myth Number 3—Pressure of Erupting Third Molars Causes Crowding of Anterior Teeth**

It is not possible for lower third molars, which develop in the spongy interior cancellous tissue of bone with no firm support, to push 14 other teeth with roots implanted vertically like the pegs of a picket fence so that the incisors in the middle twist and overlap. Yet that is the reason often given for removal of third molars, even though studies have produced contrary evidence.<sup>12-14</sup> Third molars do not possess sufficient force to move other teeth. They cannot cause crowding and overlapping of the incisors, and any such association is not causation.

#### **4.2.4. Myth Number 4—The Risk of Pathology in Impacted Third Molars Increases With Age**

The American Association of Oral and Maxillofacial Surgeons states, without substantiation, “Pathologic conditions [of impacted third molars] are generally more common with an increase in age.”<sup>1(p2)</sup> A study of more than 1756 patients who had retained more than 2000 mandibular impactions for an average of 27 years found that only 0.81% experienced cystic formation. There is no evidence of a significant increase in third-molar pathology with age.<sup>3</sup> Of course, teeth that become repeatedly symptomatic or develop associated pathology should be removed.<sup>15,16</sup>

#### **4.2.5. Myth Number 5—There is Little Risk of Harm in the Removal of Third Molars**

Given the low incidence of pathology, it is specious to contend that less than 3 days of temporary discomfort or disability is a small price to pay to avoid the future risks of root resorption, serious infections, and cysts. Also ignored is the risk of incidental injury such as broken jaws, fractured teeth, damage to the temporomandibular joints, temporary and, especially, permanent paresthesia or dyesthesia (numbness and dysfunction of the lower lip and the tongue). The box

#### **4.2.6. Complications of Third-Molar Extractions**

Pain

Swelling

Trismus

Hemorrhage

Alveolar osteitis (dry socket)

Periodontal damage

Soft-tissue infection

Injury to temporomandibular joint

Malaise

Temporary paresthesia (numbness of the lips, tongue, and cheek)

Permanent paresthesia

Fracture of adjacent teeth

Fracture of the mandible

Fracture of the maxilla

Sinus exposure or infection

Anesthetic complications

Data on the number of fractured jaws and damaged teeth are lacking. Fractures occur but are uncommon. There is little data on temporary and permanent temporomandibular joint injury after third-molar surgery, although a recent study of patients aged 15 to 20 years reported an incidence of 1.6%, which translates to thousands of such injuries each year.<sup>17</sup> However, mandibular and lingual nerve injury resulting from third-molar surgery has been more widely reported. Because the percentages of incidental (unavoidable) and iatrogenic (avoidable) injury are small, no one has previously performed the simple task of applying these figures to the entire population exposed to surgery.

Reports on the incidence of mandibular (lower jaw) nerve paresthesia vary from a low of 1.3% for temporary and 0.33% for permanent paresthesia to a high of 4.4% for temporary and 1% for permanent paresthesia.<sup>18,19</sup> Small figures, indeed! But if 3.5 million lower third molars are removed from 3.5 million persons by oral and maxillofacial surgeons (Table 2 ▶), the incidence of permanent paresthesia ranges from a low of more than 11500 to a high of 35000. Two thirds of these patients had no present or previous symptoms to warrant extraction.<sup>20,21</sup> If 67% of the surgery is unnecessary, then between 7739 and 23450 people are afflicted with permanent paresthesia unnecessarily each year (Table 4 ▶).

Persons with Paresthesia	Minimum No.	Maximum No.
Extraction of 3.5 million lower third molars		
Temporary	48,500	184,000
Permanent	11,500	35,000
Extraction of the 23% of third molars with symptoms or pathology		
Temporary	18,075	50,820
Permanent	3,811	11,500
Incidence of iatrogenic paresthesia if 67% of the extractions are unnecessary		
Temporary	30,485	103,180
Permanent	7,739	23,450
Incidence of iatrogenic paresthesia if 50% of the extractions are unnecessary		
Temporary	22,750	77,000
Permanent	5,775	17,500

4

#### Estimated Annual Incidence of Paresthesia of the Mandibular Nerve Following Third-Molar Extractions by Oral and Maxillofacial Surgeons: United States

These figures are based on simple extrapolations from studies by independent researchers, many of whom are oral and maxillofacial surgeons and therefore should be credible. Most of the paresthesias derive from third-molar surgery performed by oral and maxillofacial surgeons because they perform most third-molar extractions, including those at a high risk of nerve injury.

A recent study reported that 25% of erupted third molars may have deep periodontal pockets that are considered an indicator of periodontal disease.<sup>22</sup> Many of these are pseudopockets consisting of excess gum tissue that can be treated conservatively or reduced surgically, rather than extracted, as is done for other teeth with this condition. Nonetheless, let us assume that the incidence of third-molar pathology has been underrepresented in the other cited studies and that 50% of third-molar extractions, including those with deep periodontal pockets, are justified. In that case, among the other 50% there would be 5775 to 17 500 individuals with permanent mandibular paresthesia every year. And this does not include lingual (tongue) nerve paresthesia, which may occur as frequently as once in 10 000 mandibular extractions, adding another 350 to 500 paresthesia cases a year.<sup>23</sup> At this rate, between 57 000 and 175 000 persons in the United States have been afflicted with permanent paresthesia over the past 10 years as a consequence of unnecessary prophylactic third-molar extractions.

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### 4.3. PARESTHESIA

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How is it possible that so much harm is done and so little is heard of it? The answer is that paresthesia of the lips and tongue is not deadly. Although it is one of the most common reasons that patients sue oral and maxillofacial surgeons, most judges and jurors do not fault the surgeons, because the patients consented to surgery, thereby assuming the risk. That patients are given unsubstantiated information that would, in just circumstances, invalidate their informed consent is rarely convincing to a court.<sup>24,25</sup> Patients who might have avoided the surgery in the absence of confirmed pathology are consigned to a numb jaw or lip or tongue for the rest of their lives. Symptoms include frequent drooling, biting of the lip or the inside of the cheek or the side of the tongue, and paralytic disfigurement or drooping of the lip. The sense of taste, the facility of speech, and the sensory pleasure of kissing are diminished. When bilateral paresthesia occurs, the anguish, discomfort, and disability are more than doubled. To be sure, the degree of paresthesia varies, from mild to severe. Constant tingling numbness is the most common feature, but some patients experience frequent shooting pains much like neuralgia. Those suffering from severe paresthesia may be driven to near hysteria by a loss of sensory functions that affects all aspects of their lives.

The risk of paresthesia is not the same for all extractions. It is highest for the mesioangular impaction, in which the tooth is positioned at a 30–45° angle toward or actually against the distal, or back, surface of the second molar (Figure 1 ►).



**FIGURE 1—**

A mesioangular impaction, with the roots in close proximity to or saddling the mandibular canal containing the mandibular nerve.

When fully formed, the roots frequently lie close to the right and left mandibular nerves, which run along the jaw beneath or between the roots. The risk of permanent paresthesia following extraction of a mesioangular impaction is as high as 6.8%, much higher than for other types of unerupted or impacted teeth.<sup>6</sup> More than 95% of these teeth will never cause any problem. As many as three fourths of the developing third molars classified as mesioangular impactions at the time of extraction are not impacted at all, but would continue to erupt into normal position in the mouth if left alone.<sup>26</sup> There can be no excuse for tolerating so many unnecessary extractions on millions of unsuspecting and misled people and putting them at risk of so much iatrogenic nerve injury. This is a public health hazard.

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**4.4. THE ECONOMICS OF THIRD-MOLAR SURGERY**

Each of the approximately 5500 oral and maxillofacial surgeons in private practice averages nearly 53 third-molar cases a month, accounting for the removal of at least 7 of the 10 million “impacted” third molars extracted annually.<sup>27</sup> Most of these teeth are not impacted. Half are upper third molars, most of which can erupt normally, as will many, if not most, of the lower third molars (Figure 2 ▶). Removing these teeth while they are still developing in the jaw bone results in a higher fee: extraction when the tooth is embedded in soft tissue or bone is a more complex surgical procedure than a simple extraction after the tooth erupts. Even so, it seldom takes an oral and maxillofacial surgeon more than 8 minutes to extract an impacted tooth once the patient is anesthetized.<sup>28</sup>

**FIGURE 2—**

Panoraphic radiograph of 4 normally developing wisdom teeth, classified as full bony impactions at the time of extraction.

The average annual income of oral and maxillofacial surgeons from third-molar extractions alone is estimated at \$518 636 (see footnote, Table 2 ▶). Even though only 20% of third molars have associated pathology or tissue inflammation, allowance should be made for the 33% that may cause some discomfort (Table 3 ▶), even if the condition might resolve later on without surgery. Two thirds of all third-molar extractions are unnecessary. Eliminating these extractions would reduce the oral and maxillofacial surgeon’s annual income by \$347 486, resulting in an annual savings to patients of more

than \$1.9 billion, or \$2.2 billion if extractions by general practitioners are included (Table 3 ►).

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#### **4.5. A RATIONAL POLICY**

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The British National Institute for Clinical Excellence is unequivocal in its recommendation, adopted by the National Health Service: “The practice of prophylactic removal of pathology-free impacted third molars should be discontinued. . . . There is no reliable evidence to support a health benefit to patients from the prophylactic removal of pathology-free impacted teeth.”<sup>9(p1-2)</sup> The conditions for which extraction is justified include nonrestorable dental caries, pulpal infection, cellulitis, recurrent pericoronitis, abscesses, cysts, and fractures.

Government-funded programs in the United States are beginning to adopt similar policies; an example is the Healthy Kids Dental Program administered by Delta Dental of Michigan. Also needed is better education of dentists, beginning in dental school, and of the public on the reasons to avoid unnecessary extractions.

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#### **4.6. THE FALLACY OF TWO SCHOOLS OF THOUGHT**

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One school of thought is endorsed by oral and maxillofacial surgeons who contend that most third molars are potentially pathologic and should be removed. The other holds that only third molars with associated pathology should be removed. The legal system, in which decisions are generally based on norms of practice or local or regional standards of care, credits each school of thought as having equal merit, ignoring the scientific evidence base. That is why oral and maxillofacial surgeons usually prevail in malpractice suits when patients are injured during elective surgery. After all, if the expert oral and maxillofacial surgeon says the surgery is necessary, then it is necessary. The fact that most third molars, impacted or not, do not become diseased and that the risk of iatrogenic injury from such surgery is greater than the risk of leaving asymptomatic, nonpathologic teeth alone does not override the expert opinion of oral and maxillofacial surgeons. Thus, the prevalent practice of prophylactic third-molar extractions is ordained as the standard of care, even though that standard is based on an erroneous evaluation of all outcomes and costs.

Malpractice in dentistry is more common than is acknowledged, but the victim’s recourse to redress the physical and financial injury is severely limited.<sup>25</sup> The recovery amounts involved are usually too small to cover an attorney’s expenses. However, there is something the legal profession could do to protect the public: abolish the fallacy of the standard of care and 2 schools of thought, which ignores evidence-based science and perpetuates and forgives malpractice.

The evidence is compelling that prophylactic extraction of third molars is a significant public health hazard. It is a silent epidemic of iatrogenic injury that warrants avoidance



of the extraction of any third molar in the absence of a pathologic condition or a specific problem.

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Abstract

[Highlight Terms](#) 

No biological terms identified

A critical review of the literature about risks and benefits of the removal of impacted 3rd molar teeth is presented in 4 categories: risk of non-intervention, risk of intervention, benefit of non-intervention and benefit of intervention. There are well-defined criteria for removal of impacted 3rd molar teeth. Absolute indications and contra-indications for the removal of asymptomatic 3rd molar teeth cannot be established because no long-term studies exist which validate the benefit to the patient either of early removal or of deliberate retention of these teeth. The prudent course of action for the clinician to follow is based on rational clinical decision-making using traditional methods of evaluation to effect the optimal outcome, keeping the interests of the individual patient above all else.

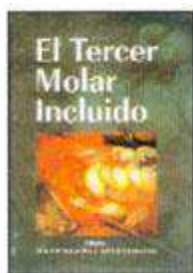
Una revisión crítica de la literatura sobre los riesgos y los beneficios de la extracción de dientes molares tercero afectado se presenta en 4 categorías: riesgo de no intervención, los riesgos de la intervención, en beneficio de la no intervención y el beneficio de la intervención. Existen criterios bien definidos para la extracción de los dientes molares impactados 3er. Las indicaciones absolutas y contraindicaciones para la eliminación de los dientes molares 3<sup>a</sup> asintomáticos no se pueden establecer porque no existen estudios a largo plazo que validan el beneficio para el paciente, ya sea de la eliminación temprana o de la retención deliberada de estos dientes. El curso de acción prudente para el clínico a seguir se basa en la toma de decisiones clínicas racional el uso de métodos tradicionales de evaluación para efectuar el resultado óptimo, manteniendo los intereses de cada paciente por encima de todo.

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## NOVEDADES EDITORIALES



### **EL TERCER MOLAR INCLUIDO**

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Los doctores Romero Ruiz y Gutiérrez Pérez, flanqueados por un equipo de quince colaboradores, han redactado un libro centrado en un tema que, con juiciosa ambición, configuran como la «piedra angular» de la Cirugía Bucal. En efecto, desde antes de la ya clásica monografía del Prof. Ríes Centeno, se han vertido ríos de tinta sobre la cirugía de un diente que, por la elevada prevalencia de su patología, la variabilidad de su presentación anatómico-clínica, la falta de consenso acerca de su cirugía electiva y la dificultad técnica que encierra con frecuencia su extirpación, constituye el «caballo de batalla» del ejercicio de la Cirugía Bucal.

En la obra, los autores efectúan un recorrido por todos los aspectos teóricos y prácticos de la patología y técnica quirúrgica, vinculada con el tercer molar incluido.

Tras un Preámbulo en el que se introduce el tema desde la perspectiva de la actual Medicina Basada en la Evidencia, se abordan, en el capítulo 1, los conceptos y denominaciones relacionadas con los dientes incluidos, terminología que es preciso aclarar de forma preliminar dada la ambigua utilización de la misma por los diversos autores ocupados del tema. El resto de este capítulo y los dos siguientes se ocupan de la etiología de la inclusión de los terceros molares, la actitud terapéutica ante los mismos, sus diversas manifestaciones clínicas y las técnicas exploratorias y semiología radiológica.

En el capítulo cuatro se desarrolla la planificación del tratamiento quirúrgico de la extirpación de los terceros molares incluidos; los capítulos cinco y seis abarcan los principios básicos de Cirugía Bucal observables en todo acto quirúrgico, así como el instrumental necesario para llevar a cabo el tratamiento de la inclusión de los cordales.

Los capítulos siete a nueve desarrollan de forma exhaustiva y secuenciada, los diversos pasos de la exéresis de los terceros molares

## Relatório Final de Estágio

inferiores incluidos, finalizando con una revisión de las complicaciones operatorias. Toda la secuencia esta complementada con fotografías y esquemas que sirven de apoyo al texto.

El capítulo diez se ocupa de situaciones especiales: germenectomía, molares supernumerarios, cordales incluidos en pacientes desdentados y terceros molares ectópicos.

El capítulo once resume los principios y fundamentos previamente tratados, pero relativos a los terceros molares superiores.

Los capítulos doce y trece se centran en actuaciones complementarias (psicológicas, farmacológicas, medicolegales, etc.) pre, intra y postoperatorias.

En el capítulo catorce se analizan las implicaciones ortodóncicas de los terceros molares incluidos, y en el quince, la relevancia de este diente en Periodoncia.

El libro se completa con dos epílogos, uno relativo a la presión asistencial de la cirugía del tercer molar y otro que abunda en la relevancia de esta patología en el sistema sanitario público.

Como queda mostrado, el texto, un auténtico tratado monográfico sobre la cirugía del tercer molar, constituye una obra de referencia para todos aquellos (estudiantes de Odontología, alumnos de postgrado, residentes y cirujanos orales y maxilofaciales) ocupados en el tratamiento de esta patología, tanto en los inicios de su profesión como en las fases maduras del ejercicio de la misma.

**Por Juan Carlos de Vicente.  
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## Do pathologies associated with impacted lower third molars justify prophylactic removal? A critical review of the literature

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Surgical removal of impacted lower third molars is widely carried out in general dental practice and in many institutional clinics. Despite the fact that there are well established indications for the removal of impacted lower third molars, prophylactic removal of these teeth is still being universally practiced. Some reports have estimated that the proportion of impacted third molars that are removed when no clinically sound justification for surgery is present is between 18% and 50.7%. Justifications for prophylactic surgery include the need to minimize the risk of disease (cysts and tumors) development, reduction of the risk of mandibular angle fracture, increased difficulty of surgery with age, and that third molars have no definite role in the mouth.

This article critically examines the literature regarding the relationship between impacted lower wisdom teeth, cysts and tumor development, and mandibular fractures.

Removal of impacted (unerupted and partially erupted) third molars, the majority of which are found in the mandible, is the most common surgical procedure in dentistry. Impacted third molars are known to be associated with the risk of different disorders and complications. There are well-established indications for the removal of impacted wisdom teeth. However, prophylactic removal of impacted third molars free of any pathology is still a common practice and therefore remains controversial. During the pre-penicillin period, prophylactic removal of wisdom teeth used to be the order of the day, because of morbidity associated with pathologies related to these teeth.<sup>1</sup> In recent times, prophylactic surgery has been justified on the basis that third molars have no role in the mouth, the need to minimize the risk of disease (cysts and tumors) development,<sup>2, 3 and 4</sup> reduction of the risk of mandibular angle fracture,<sup>5, 6, 7, 8, 9 and 10</sup> as well as increased difficulty of surgery with age.<sup>2 and 11</sup> Presently, anecdotal evidence and recent reports in the literature suggest that prophylactic removal of impacted third molars is still being universally practiced,

especially in Europe and the United States.<sup>12</sup> In fact, the proportion of impacted third molars that are removed when no clinically sound justification for surgery is present is reported to be between 18% and 50.7%.<sup>13, 14 and 15</sup> Lopes et al.<sup>13</sup> reported that over half of the patients who had their impacted third molars extracted at the Eastman Dental and University College Hospitals during a 12-month period did not have sound indications for surgery. It is also an accepted practice to recommend that when 1 third molar has a defined indication for removal, all third molars should also be extracted with the same general anesthetic. The argument for this is the avoidance of the risk of increased morbidity that may accompany future anesthetics if retained teeth develop pathologic indications necessitating removal.<sup>16</sup>

This article critically examines the literature regarding the relationship between impacted lower wisdom teeth, cyst and tumor development, and mandibular fractures.

### Risks of cyst and tumor development around impacted third molars

Although the proponents of prophylactic removal of impacted third molars have based their arguments on the likelihood of cyst and tumor development if these teeth are retained, a closer look at the literature shows that the incidence of cyst and tumor development from impacted third molars is apparently low.<sup>2, 3, 4, 16, 17, 18, 19, 20, 21, 22, 23, 24 and 25</sup> Keith<sup>23</sup> reported an incidence of 1.6% of dentigerous cysts developing from impacted wisdom teeth, whereas Alattar et al.<sup>24</sup> and Mourshed<sup>25</sup> reported an incidence of 1% and 1.4%, respectively. Shear and Shigh<sup>17</sup> in an epidemiological study also reported an incidence of 0.001% and 0.0002% in a black and white South African population. Güven et al.<sup>4</sup> also reported an incidence of 2.31% of cyst formation associated with impacted third molars. Severe impaction of a mandibular third molar is reported to be a predisposing factor for cyst development.<sup>12</sup> In other studies, a correlation between the incidence of cystic changes in follicular tissues and age of the patients has been reported.<sup>2 and 18</sup> Most cystic changes were found in patients between 20 and 25 years, and the authors of the studies therefore concluded that age may be used as an indication for surgical removal of impacted lower third molars (ILTM), as the risk of surgical morbidity also increases with the increasing age. However, radiological surveys of the mouth and jaws have shown that about 1 in 5 people in their 30s have at least 1 unerupted third molar and that these can remain in situ throughout life without pathological changes.<sup>26</sup>

The possibility of tumors such as ameloblastoma, epidermoid carcinoma, and odontogenic carcinoma arising from impacted wisdom teeth have been stressed as another indication for prophylactic removal of impacted third molars.<sup>18, 19 and 20</sup> The incidence of ameloblastoma associated with impacted third molars is reported to range from 0.14% to 2%.<sup>4, 17, 18 and 22</sup> Güven et al.<sup>4</sup> reported an incidence of 0.79% (benign, 0.77%; malignant 0.02%) of odontogenic tumors among 9994 impacted third molars in their study, a majority (92%) of which were found in the mandible. Other isolated case reports

of odontogenic tumors associated with impacted lower third molars are found in medical literature.

Reports and data from the literature indicate that cysts and tumors do develop in a relatively small minority of patients with impacted wisdom teeth. Therefore, the relatively small percentages of cysts and tumors associated with the retention of these teeth do not justify their prophylactic removal.

## Risks of mandibular fractures in the presence of impacted lower third molars

Proneness of the mandibular angle to fracture in the presence of ILTMs has long been a strong point for prophylactic removal of lower wisdom teeth, especially in adolescents and young adults who frequently play contact sports. The mandible constitutes the bony structure of the lower third of the face, and it is the most frequently fractured facial bone.<sup>27, 28 and 29</sup> The mandible has a few mechanically weak portions, including the angle, condylar process, and both sides of the mentum.<sup>29 and 30</sup> Several factors have been proposed that influence the location of mandible fractures including the site, direction, and severity of the force and impact, as well as the bone's intrinsic attributes.<sup>31 and 32</sup> Bone fractures occur when the local stresses exceed the ultimate strength of the bone in that region.<sup>33</sup> Generally, the lower part of the condylar process is likely to be fractured by a horizontal external force applied to the mentum. The lateral and median portions of the mentum and the lower part of the condylar process are easily fractured by a vertical force.<sup>31, 34 and 35</sup> Halazonetis<sup>36</sup> also concluded that the "weakest" region of the mandible to fracture is the angle, because of its natural weakness and the presence of unerupted third molars.

There is incontrovertible evidence in the literature regarding the proneness of the mandibular angle to being fractured in the presence of ILTMs.<sup>5, 6, 7, 8, 9 and 10</sup> One mechanism by which third molars have been hypothesized to increase the risk of angle fractures is by occupying osseous space and, thereby, weakening the angle region by decreasing the cross-sectional area of bone.<sup>5</sup> By using dry isolated vervet monkey mandible, Reitzik et al.<sup>31</sup> showed that mandibles with unerupted third molars required 40% less force to be fractured than the mandibles with fully erupted third molars. Based on this evidence, some investigators have advocated removing unerupted mandibular third molars to prevent angle fractures, especially in those in contact sports.<sup>5 and 9</sup> Meisami et al.,<sup>37</sup> however, opined that removing ILTMs may or may not increase the strength of the mandibular angle region in the long term, and mandibular angle may fracture under a greater force or simply fracture at a different anatomical location.

In 2004, Iida and his colleagues<sup>6</sup> in a retrospective study reported another dimension to mandibular fractures and the presence of impacted lower third molars. They found that the frequency of occurrence of the mandibular angle fracture was higher in the group with

incompletely erupted mandibular third molars ( $P < .001$ ), and that of the condylar fracture was higher in the group without it ( $P < .001$ ). Their result showed that the presence of incompletely erupted mandibular third molars diminished the incidence of condyle fractures with a statistical significance in both results of the patients ( $P < .001$ ) and the side of the mandibles ( $P < .001$ ). They therefore concluded that the presence of ILTMs helps to prevent the condylar fracture.

In another recent report,<sup>38</sup> the absence of unerupted mandibular third molars was significantly associated with higher incidence of condylar fractures ( $P < .001$ ). The authors also found that there were significantly more symphysis and condyle combination fractures in the unerupted third molar absent group than in the third molar present group ( $P < .001$ ). In 9 patients who had symphysis and bilateral condyle combination fractures, all of them had no unerupted third molars. These 2 findings suggest that when the mandible is traumatically injured in the absence of ILTMs, more force is transmitted to the condylar region; hence, the increased incidence of associated condylar fractures. Iida et al.<sup>6</sup> and Zhu et al.<sup>38</sup> have provided us with solid evidence that the presence of ILTMs help to prevent condylar fractures.

What are the implications of the recent findings regarding the proneness of mandibular condyles to being fractured in the absence of ILTMs to us as surgeons and health care providers? In terms of patient care, mandibular angle fractures are easily accessible, and excellent reduction and stable fixation are easily performed with minimal postoperative complications. On the other hand, most surgeons would agree that condylar fracture is one of the most difficult to treat in the maxillofacial region, and may be associated with malocclusion and facial nerve injury. Condylar fractures are usually more severe, are more difficult to treat, and have greater risk of long-lasting complications than angle fractures.<sup>39 and 40</sup> Is it appropriate to strengthen the mandibular angle region and to make the mandible more vulnerable to condylar fractures by means of removing an asymptomatic ILTM? Therefore, prophylactic removal of asymptomatic ILTMs may not be beneficial as a means for reducing the chances of angle fracture in those patients at risk of maxillofacial trauma.

### Complications associated with lower third molar surgery

The complications associated with the removal of impacted third molars should not be underestimated. The surgery entails incision, stripping of periosteum, bone and tooth removal, and suturing. Pain, swelling, and trismus are almost universal after this procedure, and the incidence of both inferior and lingual nerve damage is high and may be permanent.<sup>8 and 12</sup> Nerve damage with temporary or permanent labial or lingual

paresthesia or anesthesia are significant risks of surgery.<sup>12</sup> In a recent survey among oral and maxillofacial surgeons (OMS) in California,<sup>41</sup> nearly 80% of OMS are aware of patients who have permanent injury to the inferior alveolar nerve, and almost a half are aware of patients with permanent injury to the lingual nerve following impacted lower third molar removal. The total incidence of 13.4% for nerve injury was reported by Lopes et al.,<sup>13</sup> and they also found that patients who do not have clinically sound indications for surgery have a similar incidence of sensory deficit and morbidity when compared to those with accepted symptoms.

A significant adverse impact on oral health–related quality of life in the immediate postoperative period following lower third molar surgery has also been reported to increase for patients who had experienced pain/swelling/trismus.<sup>42 and 43</sup> Delayed clinical healing after third molar surgery is not uncommon, and Ruvo et al.<sup>42</sup> in a recent report showed that this significantly increased the prevalence of delayed recovery for lifestyle, oral function, late symptoms, and pain.

Intraoperative, immediate, and late postoperative mandibular fractures following ILTM surgical extractions are also well reported.<sup>12, 44, 45 and 46</sup> In addition, Shepherd<sup>47</sup> claimed that recent evidence suggests that the patients generally consider the disadvantages and complications of surgery as more serious than those of non-intervention. Liedholm et al.<sup>48</sup> also reported that outcomes of nonremoval were preferable to outcomes of surgical intervention from patients' perspectives. In another report,<sup>13</sup> 4.8% of patients thought that the surgical removal of their teeth did not relieve their original problems. Hu et al.<sup>49</sup> reported a 16.7% incidence of adverse outcome among patients treated by administration of anesthesia in an office-based setting; 62% of these patients had their impacted third molar removed. The risks of increased surgical morbidity in older patients who require impacted third molar surgery have also been advocated to justify prophylactic removal. Unless the validity of the need for surgery has been established, the fact of lesser morbidity in the younger patient should not of itself be used as an indication for preventive surgery.<sup>16</sup>

In ethical terms, carrying out a procedure that has a significant risk of morbidity and associated risks of general anesthesia without good reason is presently unacceptable.

### Cost implication and risk-benefit analysis of third molar surgery

The lack of scientific data, the morbidity, and the increasingly significant cost of treatment have led some clinicians to query the scientific validity of prophylactic removal of asymptomatic or nonpathologically involved third molar.<sup>13 and 16</sup> Operating on a patient without good reason involves unnecessary expenditure to purchasing authorities, cost to the patient in both time off work and postoperative complications, and, further, may result in potentially avoidable legal problems for practitioners.<sup>13</sup> Venta et al.<sup>50</sup> reported that



between 1987 and 1993 in Finland there were 139 claims for permanent sensory or motor disturbances related to removal of lower third molars. The lingual nerve was injured in 54% and the inferior alveolar nerve in 41% of the claims. Health insurance companies may even query the veracity of treatment claims.<sup>51</sup> In the United States, the largest expenditure for any surgical procedure by the Blue Shield in the state of Pennsylvania was for third molar surgery, and this represented 50% of the cost of all oral surgery.<sup>51</sup> A similar high expenditure was also reported from England.<sup>52</sup> A study of sick leave after third molar surgery in one study<sup>13</sup> showed that 81% of patients took time off work. The modal number of days off work was 3, with a range of 0 to 10 days. In another study,<sup>49</sup> the mean number of work days missed after third molar surgery was 1.26 (SD = 1.49), and the average number of days that the patient was unable to perform his or her daily activities was 1.23 (SD = 2.98). Therefore, from a cost implication point of view it is acceptable only to remove teeth with appropriate well-defined indications.

## Established indications for lower third molar removal

The indications for removal of impacted lower wisdom teeth are clearly established. These include recurrent pericoronitis, cellulitis, abscess, osteomyelitis, disease of follicles including cysts and tumors, unrestorable caries or periodontal breakdown, prophylactic removal in the presence of medical or surgical conditions, among others.<sup>53, 54 and 55</sup> The first attempt to create simple but effective guidelines to aid decision making regarding removal of third molars was made at a National Institutes of Health Conference in the United States in 1979.<sup>53</sup> In 1997, the Faculty of Dental Surgery of the Royal College of Surgeons of England published guidelines for the management of patients with impacted wisdom teeth.<sup>55</sup> The endorsement of these guidelines by the National Institute for Clinical Excellence (NICE) of England in March 2000,<sup>56</sup> with the added comment that a first episode of pericoronitis, unless otherwise severe, should not be considered an indication for removal, made prophylactic removal in the absence of specific medical and surgical conditions unjustifiable. Although recurrent pericoronitis is generally accepted as a defined indication for ILTM extraction, there are some cases where simple excisional surgery to expose the clinical crown may be indicated.<sup>16</sup>

## Conclusions

There are well-established indications for removal of impacted lower third molars. Although ILTMs may sometimes be associated with pathologies, this occurs in a relatively small proportion of patients according to reports in the literature. Patients with ILTMs are more likely to have an angle fracture than those patients without impacted mandibular third molars, but emerging evidence, however, shows that the presence of ILTMs helps to prevent condylar fractures, which are more severe, are more difficult to treat, and have greater risk of long-lasting complications than angle fractures. Is continuation of prophylactic ILTM extraction an evidence-based practice in light of the above facts? Evidence-based practice involves tracking down the available evidence, assessing its validity, and then, using the best evidence, to inform decisions regarding care.<sup>57</sup> In fact, the principles and methods of evidence-based dentistry give dentists the opportunity to apply research findings to the care of their patients.<sup>57</sup> Prophylactic extraction of impacted lower third molars in the absence of specific medical and surgical conditions should be discontinued. The decision to extract or not to extract impacted third molars should be individualized, rather than generalized. All patients with impacted third molars should be evaluated and treatment planned based on their individual presentation, and should not be subjected to a “standardized generic treatment protocol.” Extraction of impacted third molars should be limited to those teeth with well-defined medical, surgical, or pathologic indications.

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An investigation into post-operative pain after third molar surgery under local analgesia

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Abstract

The pain experienced after third molar surgery was investigated over a 7 day post-operative period in 80 patients. The results from the study suggest that post-operative pain is of short duration and reaches its maximum intensity in the early post-operative period. Nearly all patients required an analgesic at some time during the 7 days. The sex of the patient and whether there is a previous history of pericoronitis are important determinants of post-operative pain. However, the magnitude of post-operative pain does not appear to be dependant upon the operator or related to the extent of surgical trauma as assessed by operating time and radiographic score.

1. Abstracto

El dolor experimentado después de la cirugía del tercer molar fue investigado en un período post-operatorio de 7 días en 80 pacientes . Los resultados del estudio sugieren que el dolor post -operatorio es de corta duración y alcanza su máxima intensidad a principios del período post-operatorio . Casi todos los pacientes requieren un analgésico en algún momento durante los 7 días . El sexo del paciente y si hay una historia previa de pericoronaritis son determinantes importantes de dolor post -operatorio . Sin embargo , la magnitud del dolor post -operatorio no parece ser dependiente de la operadora o relacionado con el grado de trauma quirúrgico según la evaluación de tiempo de funcionamiento y la puntuación

**Risk Indicators of Postoperative Complications following Surgical Extraction of Lower Third Molars**

## Introduction

The surgical extraction of lower third molars is the most common intervention in oral surgery [1]. It is usually associated with considerable postoperative complications that have biological and social impact [2, 3]. These complications include dysesthesia, severe infection, fracture, dry socket, pain, swelling, trismus, hemorrhage, oroantral communication, damage to adjacent teeth, and displaced teeth [4, 5]. Factors thought to affect the occurrence of complications after third molar removal include age, gender, medical history, smoking, use of oral contraceptives, poor oral hygiene, presence of pericoronitis, relationship of third molar to the inferior alveolar nerve, type of impac

**Key Words** Pain Swelling Trismus Dry socket Third molar extraction

Complications after extraction

**Abstract** Objective: The aim of this prospective clinical trial was to evaluate the incidence of postoperative complications following surgical extraction of lower third molars (L8) and the risk factors and clinical variables associated with these complications. Subjects and Methods: Three-hundred and twenty-seven consecutive patients (128 men and 199 women, mean age = 23.18 ± 3.9 years, range: 18–40) were recruited to this study. The L8 of all the patients were surgically extracted. Immediate and late complications like pain, swelling, trismus, paresthesia, bleeding, dry socket, infection and fracture were assessed 3 and 7–14 days, respectively, following the surgery. Results: The most frequent immediate and late complications were slight pain, swelling, and trismus. Thirty-nine (11.9%) patients reported dry socket and 10 (0.3%) reversible sensory nerve complications. More immediate and late complications were experienced by females ( $p = 0.000$  and  $0.016$ , respectively). Older subjects reported more late complications. Frequent immediate and late complications were associated with preexisting pericoronitis, longer duration of operation, extraction of two molars, flaps with vertical incision, extractions with bone removal, extractions without tooth sectioning and distoangular impactions

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tion, surgeon's experience, anesthetic technique, surgical time, surgical technique, topical antiseptics, intrasocket medications, and perioperative antibiotics [4, 5]. Postoperative complications after the surgical extraction of a lower third molar still remain a significant factor in patient comfort and recovery. The knowledge of various methods of reducing morbidity following third molar surgery would help both the surgeon and the patients in the management of impacted lower third molars [6]. Consequently, clinicians would profit from knowing the risk factors that are associated

with postoperative complications following third molar surgery. This in turn will enable them to avoid subjecting patients to such risks while carrying out lower third molar surgery. Therefore, the aim of this prospective clinical trial was to evaluate the incidence of postoperative complications following third molar surgical extraction and the risk factors such as age, sex, angulation of third molars, duration of surgery, type of surgical flap design, and the need for tooth sectioning and bone removal that are associated with the incidence of these complications.

#### Subjects and Methods

Three hundred and twenty-seven consecutive patients (128 men and 199 women) were recruited to the study from patients attending the oral and maxillofacial surgery clinic for surgical extraction of lower third molars at Jordan University Hospital, Amman, Jordan. Mean age of the patients was 23.1 ± 3.9 years (range 18–40). Each patient was thoroughly assessed clinically and radiographically before and after third molar surgical extraction. Before surgery, the assessment included patients' dental and medical histories, complaints, and personal information regarding name, age, gender, level of education, occupation, address and marital status. The angulation of third molars with respect to the longitudinal axis of the second molar (mesial angulation, distal angulation, vertical and horizontal) was evaluated from orthopantomography and recorded based on the classification of Winter [7]. Patients with any medical problem that might affect immunity or contraindicate surgery such as diabetes, cardiovascular disease, bleeding disorders, kidney or liver disease, respiratory disease, AIDS, hepatitis B or C were excluded from the study. None of the recruited patients had any of the above-mentioned medical problems. The lower third molars of all recruited patients were surgically extracted by the same surgeon, who is an experienced consultant in oral and maxillofacial surgery. All patients received antibiotic treatment (either intravenous Velocet 1 g or intraoral cephalexin 500 mg) before or during and after the surgery. All unilateral surgeries were conducted under local anesthesia while bilateral surgeries were conducted under general anesthesia. After surgery, assessment included the number of extracted teeth, duration of surgery, type of flap (envelope flap versus flap with vertical incision), the need for bone removal and tooth sectioning, and immediate and late complications of the surgery. The assessed complications included pain, swelling, trismus, paresthesia, bleeding, dry socket, infection and fracture. Immediate complications were assessed during the first 3 days following the surgery and late complications were assessed 7–14 days later in the clinic in postoperative visits. Patients rated the severity of postoperative pain by choosing a number from 0 to 10 on

a visual analogue scale. The severity of swelling was evaluated by the investigator (Z.M.) and was subjectively categorized into slight, moderate, and severe depending on the size of the swelling in relation to the face: slight swelling – if less than one third of the cheek on the side of the surgery was involved; moderate swelling – if one to two thirds of the cheek was involved; severe swelling – when more than two thirds of the cheek was affected. Trismus was assessed by measuring the mouth opening before surgery and postoperatively. If the mouth opening was reduced by one third this was considered as slight trismus; up to two thirds trismus was considered to be moderate and if the reduction was more than two thirds of the preoperative mouth opening, trismus was considered to be severe. Statistical Analysis The data were analyzed using SPSS computer software (Statistical Package for the Social Sciences, version 11.0, SPSS Inc., Chicago, Ill., USA). The association between the variables was analyzed using the  $\chi^2$  test and Pearson's correlation test, while the linear regression analysis was used to predict complications. For all statistical analyses, the significance level was set at  $p < 0.05$ .

#### Results

One hundred and four patients (104, 31.9%) had only one lower third molar removed (60 patients left and 44 right third molars), while 223 (68.2%) patients had both right and left third molars extracted. Patients' preoperative complaints were pericoronitis ( $n = 255$ ), caries ( $n = 62$ ) and orthodontic problems ( $n = 10$ ). Duration of the surgery ranged from 15 min for the extraction of one molar to 90 min for the extraction of two molars. Mean surgical time was  $32.2 \pm 13.5$  min for each molar. Also, envelope flaps were used in 110 patients while flaps with vertical incision were used in 217 patients. Bone removal was required in 272 patients while tooth sectioning was required in 123 patients. Patients' immediate postoperative complications are summarized in table 1. The most frequent complications were slight pain, swelling, and trismus. The late complications are summarized in table 2; the most frequent complications were also slight pain, swelling, and trismus. However, no late complications were recorded in 187 patients. The inclination of impacted third molars among the patients is given in table 3. In total, 267 lower right third molars and 283 lower left third molars were extracted.

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Correlations Immediate complications were significantly related to gender ( $p = 0.000$ ), pre-operative complaints ( $p = 0.026$ ), number of extracted teeth ( $p = 0.011$ ), duration of

the procedure ( $p = 0.009$ ), type of flap ( $p = 0.000$ ), the need for bone removal ( $p = 0.000$ ), the need for tooth sectioning ( $p = 0.000$ ), and the inclination of the impacted lower third molar ( $p = 0.000$ ; table 4 ). Female patients reported significantly more frequent immediate complications. Also, more frequent immediate complications were associated with preexisting pericoronitis, extraction of two molars in the same patient, longer duration of the operation, flaps with vertical incision, extractions needing bone removal, extractions without tooth sectioning, and mesioangular third molars. Older patients and females reported significantly more frequent late complications ( $p = 0.000$  and  $0.016$ , respectively). Also, more frequent late complications were associated with preexisting pericoronitis ( $p = 0.000$ ), extraction of two molars in the same patient ( $p = 0.000$ ), longer duration of the operation ( $p = 0.000$ ), flaps with vertical incision ( $p = 0.000$ ), extractions needing bone removal ( $p = 0.001$ ), extractions without tooth sectioning ( $p = 0.000$ ), and mesioangular impacted third molars ( $p = 0.000$ ; table 4 ).

When each immediate complication was considered individually the following significant relations were identified: extraction of two molars was associated with more trismus ( $r = 0.161$ ,  $p = 0.003$ ); bone removal with more swelling ( $r = -0.4$ ,  $p = 0.000$ ) and more trismus ( $r = -0.5$ ,  $p = 0.000$ ), and vertically inclined molars with less trismus ( $r = 0.171$ ,  $p = 0.004$ ). When each late complication was considered individually the following significant relations were identified using Pearson's correlation: older patients had more trismus ( $r = 0.11$ ,  $p = 0.046$ ) and dry socket ( $r = 0.242$ ,  $p = 0.000$ ), females less trismus ( $r = -0.195$ ,  $p = 0.000$ ) and dry socket ( $r = -0.169$ ,  $p = 0.002$ ). Pericoronitis was significantly associated with more swelling ( $r = -0.135$ ,  $p = 0.015$ ), but less trismus ( $r = 0.118$ ,  $p = 0.033$ ) and dry socket ( $r = 0.212$ ,  $p = 0.000$ ). Extraction of two molars was associated with more swelling ( $r = -0.133$ ,  $p = 0.016$ ) and dry socket ( $r = -0.238$ ,  $p = 0.000$ ). Longer duration of the surgical extraction was associated with more swelling ( $r = 0.120$ ,  $p = 0.03$ ). Envelope flap was associated with less pain ( $r = 0.363$ ,  $p = 0.000$ ), less swelling ( $r = 0.351$ ,  $p = 0.000$ ), less trismus ( $r = 0.52$ ,  $p = 0.000$ ), and less dry socket ( $r = 0.477$ ,  $p = 0.000$ ). Bone removal was associated with more trismus ( $r = -0.152$ ,  $p = 0.006$ ). Tooth sectioning was associated with less pain ( $r = -0.204$ ,  $p = 0.000$ ) and

Table 1. Immediate complications associated with surgical removal of lower third molars (n = 327)

Complication	Frequency	Percent	Slight pain	24	7.3	Slight pain and swelling	22	6.7
Slight pain, swelling and trismus	165	50.5	Slight pain and trismus	11	3.4	Moderate pain, swelling and trismus	87	26.6
Severe pain, swelling and trismus	18	5.5	Total	327	100.0			

Table 2. Late complications associated with surgical removal of lower third molars (n = 327)

Complication	Frequency	Percent
Slight pain	7	2.1
Slight pain and swelling	3	0.9
Slight pain, swelling and trismus	11	3.4
Slight pain and trismus	46	14.1
Slight swelling	2	0.6
Slight swelling and trismus	5	1.5
Slight swelling, trismus and numbness	1	0.3
Slight trismus	24	7.3
Slight trismus and dry socket	32	9.8
Dry socket	7	2.1
Infected socket	2	0.6
No complications	187	57.2
Total	327	100.0

Table 3. Inclination of impacted third molars among the study population

Inclination of the third molar

Lower right third molar

Lower left third molar frequency percent frequency percent Vertical 61 18.7 62 19.0

Mesioangular 119 36.4 133 40.7 Distoangular 72 22.0 74 22.6 Horizontal 15 4.6 14 4.3

Total 267 81.7 283 86.5

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trismus ( $r = -0.27$ ,  $p = 0.000$ ). Vertical inclination of the extracted third molar was associated with less pain ( $r = 0.286$ ,  $p = 0.000$ ), swelling ( $r = 0.187$ ,  $p = 0.002$ ), trismus ( $r = 0.511$ ,  $p = 0.000$ ), and dry socket ( $r = 0.30$ ,  $p = 0.000$ ). Linear regression analysis showed that the need for bone removal, the need for tooth sectioning and the inclination of the impacted lower third molar were the best predictors of the occurrence of immediate complications following the surgical removal of lower third molars ( $r = 0.699$ ,  $p = 0.000$  for all factors). On the other hand, the best predictors of late complications following third molar surgical extraction were flap type ( $r = 0.599$ ,  $p = 0.000$ ), the need for tooth sectioning ( $r = 0.599$ ,  $p = 0.000$ ), and inclination of the impacted third molar ( $r = 0.599$ ,  $p = 0.006$ ). When each individual complication was predicted separately, the best predictors for immediate swelling were the need for bone removal ( $r = 0.451$ ,  $p = 0.000$ ). The best predictors for immediate trismus were the number of extracted teeth ( $r = 0.537$ ,  $p = 0.005$ ), the need for bone removal ( $r = 0.537$ ,  $p = 0.000$ ), and the inclination of the impacted molar ( $r = 0.537$ ,  $p = 0.032$ ). On the other hand, the best predictors for late pain are the type of the flap ( $r = 0.410$ ,  $p = 0.000$ ) and the need for tooth sectioning ( $r = 0.410$ ,  $p = 0.008$ ). Also, the best predictors for late swelling were preoperative complaints ( $r = 0.449$ ,  $p = 0.000$ ), the number of extracted teeth in the same patient ( $r = 0.449$ ,  $p = 0.001$ ), duration of the surgery ( $r = 0.449$ ,  $p = 0.000$ ), and type of the utilized flap ( $r = 0.449$ ,  $p = 0.000$ ). In addition, the best predictors for late trismus were duration of the surgery ( $r = 0.634$ ,  $p = 0.042$ ), flap type ( $r =$



0.634,  $p = 0.000$ ), the need for bone removal ( $r = 0.634$ ,  $p = 0.008$ ), the need for tooth sectioning ( $r = 0.634$ ,  $p = 0.015$ ), and the inclination of the impacted molar ( $r = 0.634$ ,  $p = 0.000$ ). Finally, the best predictors for dry socket were gender ( $r = 0.575$ ,  $p = 0.009$ ), preoperative complaint ( $r = 0.575$ ,  $p = 0.013$ ), and flap type ( $r = 0.575$ ,  $p = 0.000$ ).

#### Discussion

This study has shown that some factors have a definitive role in the incidence of postoperative complications following third molar surgery. Female patients experienced more immediate and late complications, similar to the results of Monaco et al. [8] and Blondeau and Daniel [4]. This could be due to the small size of their jaws, limited surgical field, hormonal status and more dense bone that makes the surgeries more difficult and traumatic. Older subjects experienced more late complications as in previous studies [8–12], but in contrast to the findings of Fisher et al. [13]. This could be due to the delayed healing capacities associated with aging as well as the increased bone density that might make the surgery more difficult. More frequent immediate and late complications associated with longer duration of surgery, flaps with vertical incision, extractions needing bone removal, and extractions without tooth sectioning might be responsible for making the surgery more traumatic and more difficult, and thus could increase the risk for postoperative complications. However, these findings contradicted those of Monaco et al. [8] and Fisher et al. [13], who found

Table 4. R relationship between complications and associated factors using 2 test ( $n = 327$ )

Factor Degree of freedom using Pearson's 2 test

Significance ( $p$  value)<sup>1</sup>

immediate	late	immedi	ate	late	Age	85	221	0.211	0.006	Gender	5	13	0.000	0.016
Preoperative complaint	10	26	0.026	0.000	Number of extracted teeth	5	13	0.011	0.000					
Duration of surgical procedure	40	104	0.009	0.000	Type of flap	5	13	0.000	0.000					
Need for bone removal	5	13	0.000	0.001	Need for tooth sectioning	5	13	0.000	0.000					
Inclination of impacted third molar	15	39	0.000	0.000	1	S ignificant relation if $p \leq 0.05$ .								

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no association between duration and difficulty of the extraction and postoperative complications. This contradiction could be due to the small number of samples or the different study settings and factors that were studied. Considering the angulation of third molars, extraction of vertical third molars was associated with the least complications whereas distoangular molars were associated with most complications.

This could be due to the increased difficulty of extraction and the need for more bone removal and time for surgery similar to previous studies [12, 14], but in contrast to Fisher et al. [13]. Preexisting pericoronitis was associated with more complications, which confirms the results of previous studies [14, 15]. However, our finding contradicted other studies that found no relation between preexisting pericoronitis and postoperative complications [12, 13]. The incidence of 11.9% of patients who reported dry socket in our study is within the incidence range of 0–35% reported previously [2, 9, 10, 16]. However, the reversible sensory nerve complications of 0.3% in our study are less than the reported incidence of 0.5–20% in previous studies [2, 12, 17–19]. These differences could be due to the criteria used to define complications. The strength of our study is that it is the only published report with a large number of patients that evaluated all patients postoperatively and that analyzed postoperative complications by angulation of impacted molars, the need for bone removal, the type of the utilized flap, and by the need for tooth sectioning. However, other studies involved either extremely small numbers of patients in prospective studies or larger numbers in retrospective studies, none of which stated whether the patients were all seen postoperatively [20, 21].

#### Conclusions

The most frequently reported immediate and late complications of this study were slight pain, swelling, and trismus. Certain factors including preoperative complaints, angulation of impacted molars, the duration of surgery, the need for bone removal, the type of the utilized flap, and the need for tooth sectioning predicted and had an impact on the incidence of postoperative complications following third molar surgery. Females and older patients are likely to have more postoperative complications following surgical extraction of lower third molars. We recommend that clinicians should be mindful of the above risk indicators during planning for surgical extraction of lower third molars in order to reduce postoperative complications and thus improve the outcome of the provided treatment.

**The use of third molar surgery in clinical pharmacology. *british journal of oral and maxillofacial surgery*, 1993, vol. 31, no 6, p. 360-365.**

## **Abstract**

This review discusses the various sequelae that arise after third molar surgery and their use for assessing the efficacy of a variety of therapeutic measures. The surgical procedure provides an opportunity to investigate onset, depth, duration and possible systemic effects of local anaesthetic solutions. Also, the anxiety which often accompanies such surgery lends itself to the appraisal of different anxiolytic agents and sedation techniques. The immediate postoperative sequelae of pain, buccal swelling and trismus provides a useful clinical model for evaluating the efficacy of analgesics and anti-inflammatory drugs. Third molar tooth sockets are susceptible to infection and this propensity enables the assessment of different antibiotic regimens. A further advantage of the third molar model is its application for crossover studies, with the patient acting as their own control. Very few surgical procedures afford this facility, which further adds to the value of this model in clinical pharmacology.

### *Abstracto*

Esta revisión describe los diferentes secuelas que surgen después de la cirugía del tercer molar y su uso para la evaluación de la eficacia de una variedad de medidas terapéuticas. El procedimiento quirúrgico ofrece una oportunidad para investigar la aparición, la profundidad, duración y posibles efectos sistémicos de soluciones de anestésicos locales. Además, la ansiedad que a menudo acompaña a este tipo de cirugía se presta a la evaluación de los diferentes agentes ansiolíticos y técnicas de sedación. Las secuelas postoperatorio inmediato del dolor, hinchazón bucal y trismo proporciona un modelo clínico útil para evaluar la eficacia de los analgésicos y fármacos anti-inflamatorios. Alvéolos dentales Terceros molares son susceptibles a la infección y esta propensión permite la evaluación de los diferentes regímenes de antibióticos. Una ventaja adicional de la tercera molar modelo es su aplicación para estudios cruzados, con la actuación del paciente como su propio control. Muy pocos procedimientos quirúrgicos ofrecen este servicio, lo que aumenta aún más el valor de este modelo en la farmacología clínica.

