Clinical Management in Dentistry

"The Application of Advanced Techniques for Dental Practice"

Authors
Agus Sumono, ***et al.***

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Pasal 113 Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta:

(1) Setiap Orang yang dengan tanpa hak melakukan pelanggaran hak ekonomi sebagaimana dimaksud dalam Pasal 9 ayat (1) huruf i untuk Penggunaan Secara Komersial dipidana dengan pidana penjara paling lama 1 (satu) tahun dan/atau pidana denda paling banyak Rp100.000.000 (seratus juta rupiah).

(2) Setiap Orang yang dengan tanpa hak dan/atau tanpa izin Pencipta atau pemegang Hak Cipta melakukan pelanggaran hak ekonomi Pencipta sebagaimana dimaksud dalam Pasal 9 ayat (1) huruf c, huruf d, huruf f, dan/atau huruf h untuk Penggunaan Secara Komersial dipidana dengan pidana penjara paling lama 3 (tiga) tahun dan/atau pidana denda paling banyak Rp500.000.000,00 (lima ratus juta rupiah).

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Foreword

First of all, thanks to Allah SWT the help of Allah, the authors finished writing the reference book entitled "Clinical Management in Dentistry: The Application of Advanced Techniques for Dental Practice". In these two years, dental informatics has applied many technological advances and discoveries to become a medical research discipline of significant scale and scope. The purpose of writing this book is to update our knowledge and gain experience in dentistry sciences. The book covers various topics in dental science, technology, health issues, etc.

The dental profession is responsible for preventing, diagnosing, and treating diseases and disorders of the oral cavity and related structures. Advances in dental technology have led to dramatic improvements in the ability of practitioners to restore tooth structure, replace lost teeth, and change the appearance of intrinsically or extrinsically discoloured teeth. I want to express our deep appreciation to all the authors for sharing their knowledge and experience for this book.

I hope this book is helpful for all of us
Thank you

Dean of Faculty of Dentistry of Universitas Jember

drg. R. Rahardyan Parnaadji, M.Kes., Sp.Pros

Preface

Praise be to Allah, God Almighty, for His mercy and grace, so that this book can be completed.

We thank those who support us regarding this book from the writing process until its published, namely the researchers, writers, reviewers, publishers, and many more that we cannot mention one by one.

This book titled "*Clinical Management in Dentistry: The Application of Advanced Techniques for Dental Practice*" is a collection of research results in the field of dentistry. The purpose of writing this book is to update our knowledge and gain experience in dentistry sciences as well as improve the quality of dental practice management in the midst of rapid technological changes

We realize that this book still has weaknesses and shortcomings. Therefore, we expect constructive criticism for it to be better. Finally, the writers hope that this book will be useful to all readers.

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Table of Content

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M.N. Amin[1*]

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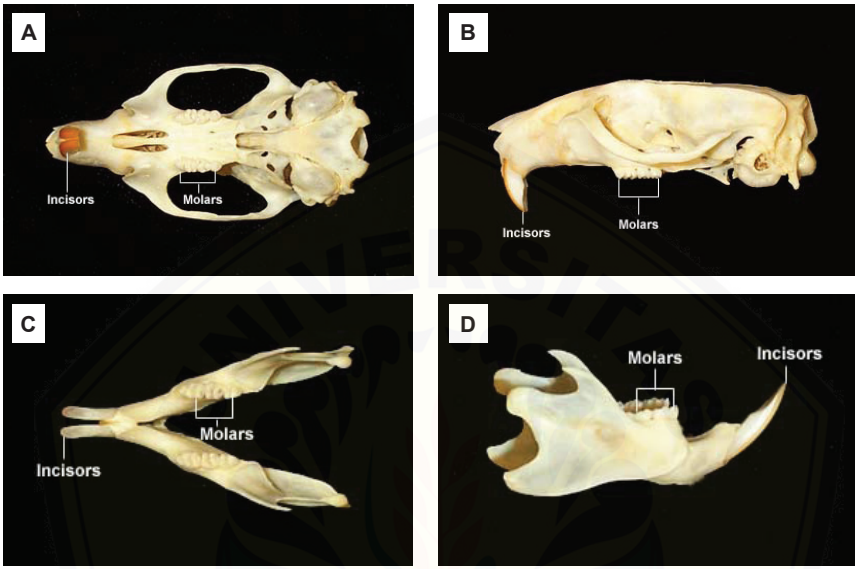

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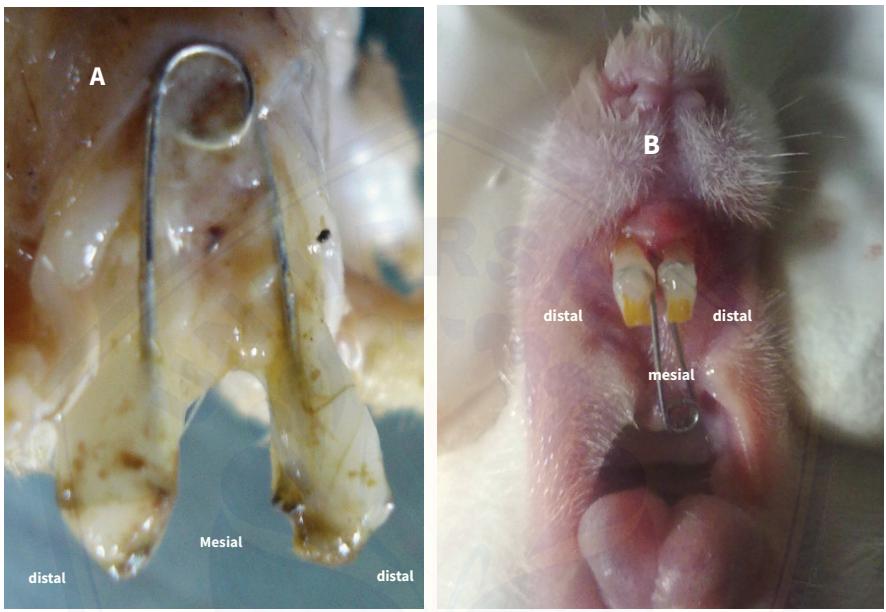

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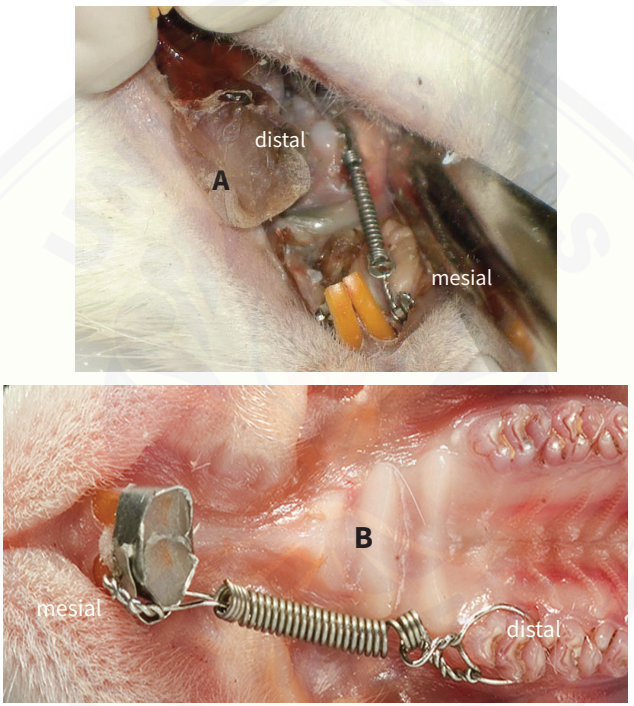

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biomolecular research methods as well as the development of very widely used transgenic strains of rats. [13, 14]

The use of orthodontic appliances with simple coil and spring coil designs attached to tooth moved by adhesives will provide a continuous force type which makes the force result in more effective tooth movements compared to others. [15] In moving the teeth, the mechanical force that has to be loaded to the tooth going to be moved has a less force than the other, thus in other forces (intermittent force and periodic forces), it requires a larger mechanical force to move the same tooth like a continuous force application. This large force produces excessive pressure and results in tissue necrosis (periodontal ligament hyalinization). This hyalinization occurs when the normal periodontal ligament is impaired and is marked by loss of the fibrous organization and the absence of the observed cells. Hyalinization shows collagen fibers without proper orientation. Irregular bone surfaces are found indicating the occurrence of direct or frontal resorption. However, in recent studies it has been shown that hyalinization zones in the compression area occur at this stage, especially in areas with high applied forces. This suggests that the formation and removal of the necrotic region is a continuous process or more than one occurrence during the movement of the tooth. It also shows that bone resorption in compression area is not a reaction to the force but it occurs to dissipate ischemic bone tissue adjacent to the hyalinization tissue. [16]

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The use of simple coils applied to the upper incisor in mesial of the rats with band modification will result in distal movement. The movement of the teeth using this design has several advantages compared to other designs e.g. easy and inexpensive design, easy application in experimental animals, large applied force

can be measured accurately and the most important aspect is movement of teeth produced is bodily movement.[7]

CONCLUSION

It can be concluded that although rats have some weakness but they can be used as ideal model of experimental animals and optimal to describe alveolar bone remodeling on tooth movement with orthodontic appliance application

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Book Chapter _muhammad nurul amin_CLINICAL MANAGEMENT IN DENTISTRY

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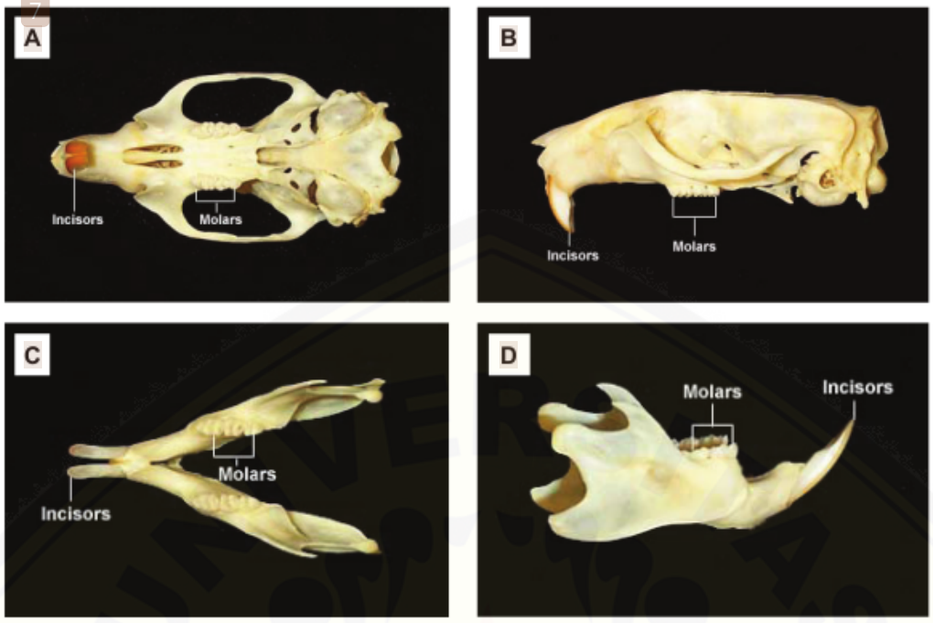

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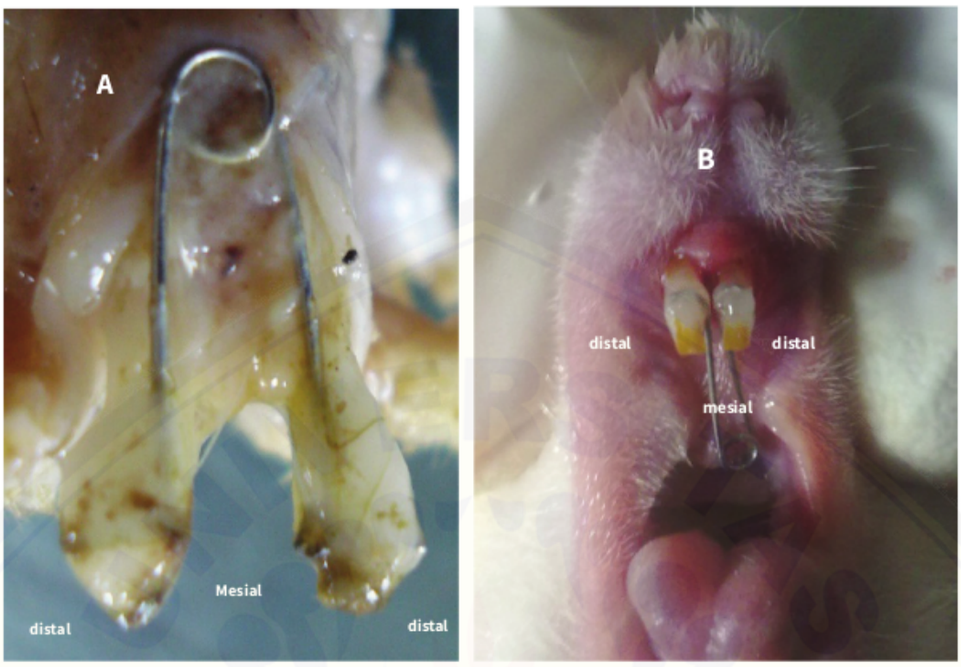

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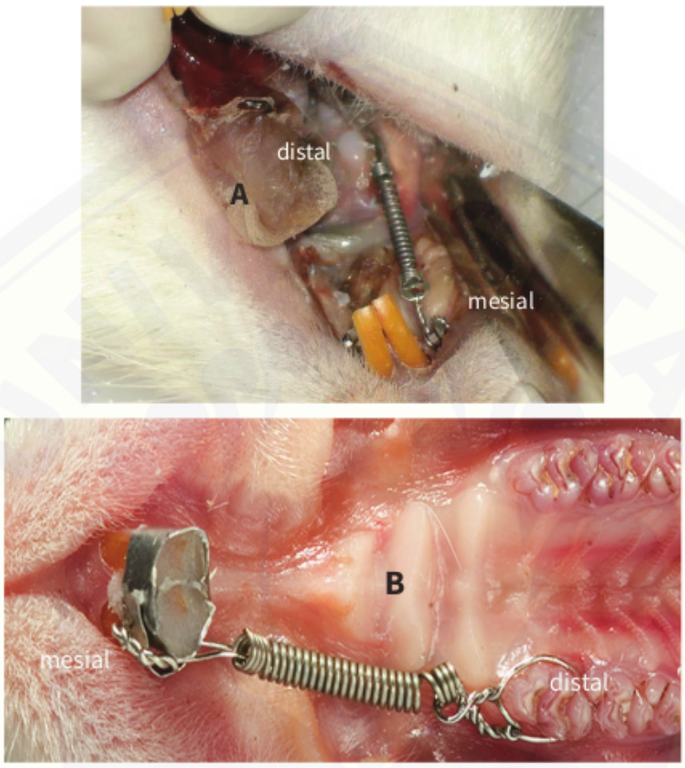

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Meikle states that if there is hyalinization and undermining resorption thus the movement of teeth will slow down. [17] This may be due to the slow stimulation of osteoclast formation in the bone marrow and the thicker bone that needs to be resorbed. Simultaneous tooth movement occurs in the frontal resorption, while on large pressure application, tooth movement is like skipping. On the other hand, Viecilli states that hyalinization occurs more in tipping movements than bodily because it is resulted from the loading of mechanical forces on a larger area of the tooth to be moved.[18,19] In this condition, it can be interpreted that the ideal tooth movement is a continuous mechanical force resulting in bodily movement.

The use of simple coils applied to the upper incisor in mesial of the rats with band modification will result in distal movement. The movement of the teeth using this design has several advantages compared to other designs e.g. easy and inexpensive design, easy application in experimental animals, large applied force

can be measured accurately and the most important aspect is movement of teeth produced is bodily movement.[7]

CONCLUSION

It can be concluded that although rats have some weakness but they can be used as ideal model of experimental animals and optimal to describe alveolar bone remodeling on tooth movement with orthodontic appliance application

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THE POTENCY OF RATS AS ANIMAL MODEL OF ALVEOLAR BONE REMODELING INDUCED BY ORTHODONTIC TOOTH MOVEMENT

Author:
MUHAMMAD NURUL AMIN

INTRODUCTION

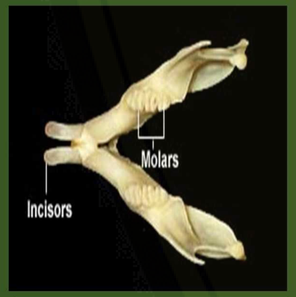
The process of alveolar bone remodeling to move the teeth is a time-consuming process and requires visits for repetitive appliance activation leading to discomforting pain that results in most patients being uncooperative and not continuing the undergoing treatment (1). Many studies have been conducted in manipulating the process of alveolar bone remodeling in order to shorten this process. The research in order to manipulate alveolar bone remodeling often uses experimental animals with a variety of considerations (2)

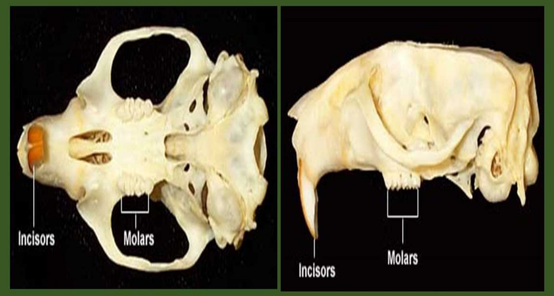
AIM

explaining and understanding whether the animal models could describe the movement of teeth with orthodontic appliance application

RAT BIOLOGICAL DESCRIPTION (3)

Biological Data	Quantity
Weight	
Male (gram)	300 – 400
Female (gram)	250 – 300
Life span (years)	2.5 – 3
Body Temperature (°C)	37.5
Water requirement (ml/100g BW)	8 – 11
Food requirement (g/100g BW)	5
Puberty (Days)	50 – 60
Length of pregnancy (days)	21 – 23
Eyes open (days)	10 – 12
Blood pressure	
Systolic (mmHg)	84 – 184
Diastolic (mmHg)	58 – 145
Heart frequency (per minute)	330 – 480
Respiration frequency (per minute)	66 – 114
Tidal volume (ml)	0.6 – 1.25
Tooth Formula	1 0 0 3 / 1 0 0 3

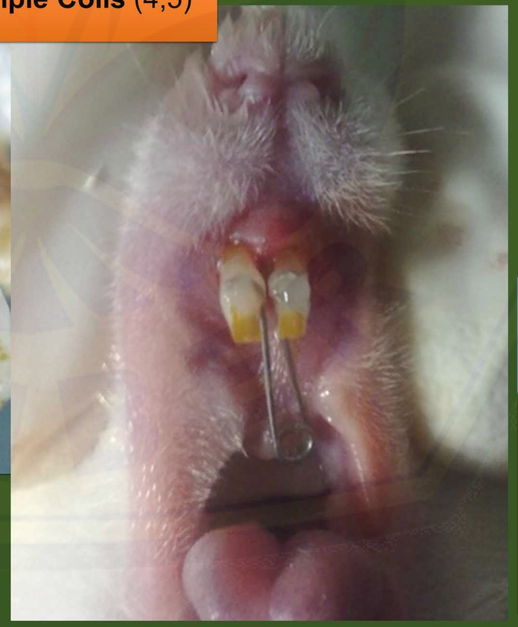




DESIGN OF ORTHODONTIC APPLIANCE

Coil Spring (6,7)

Simple Coils (4,5)



DISCUSSION

The researches in the field of dentistry, especially related to orthodontics (movement of teeth) in Brazil, used rats as experiemental animals of 60%, while the rest use other animals. (8)

The advantages of rat animal model: relatively inexpensive, easy to breed, and long-lasting, possible to enlarge the number of research samples, more easily to place orthodontic appliance even in relatively large size, to have easier histological preparation materials The disadvantages of rat animal model: alveolar bone of rat is more dense than that of humans, no osteon, lack of osteoid tissue on the surface of the alveolar bone and lack of mucopolysaccharide in the extra cellular matrix of bone (9). The use of orthodontic appliances with simple coil and spring coil designs attached to tooth moved by adhesives will provide a continuous force type which makes the force result in more effective tooth movements compared to others (9).

The use of simple coils applied to the upper incisor in mesial of the rats with band modification will result in distal movement. The movement of the teeth using this design has several advantages compared to other designs e.g. easy and inexpensive design, easy application in experimental animals, large applied force can be measured accurately and the most important aspect is movement of teeth produced is bodily movement (5).

CONCLUSION

It can be concluded that although rats have some weakness but they can be used as ideal model of experimental animals and optimal to describe alveolar bone remodeling on tooth movement with orthodontic appliance application

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