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ORIGINAL ARTICLE

Histopathological comparison of bone healing effects of endonasal and percutaneous lateral osteotomy methods in rabbit rhinoplasty model[☆]

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KEYWORDS

Endonasal osteotomy;
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Animal model

Abstract

Introduction: Lateral osteotomy is mainly performed either endonasally or percutaneously in rhinoplasty which is a frequently performed operation for the correction of nasal deformities. Both techniques have both advantages and disadvantages relative to each other.

Objective: The aim of this study was to compare the histopathological effects of endonasal and percutaneous osteotomy techniques performed in rhinoplasty on bone healing and nasal stability in an experimental animal model.

Methods: Eight one year-old New Zealand white rabbits were included. Xylazine hydrochloride and intramuscular ketamine anesthesia were administered to the rabbits. Endonasal osteotomy (8 bones) was performed in Group 1 (n=4), and percutaneous osteotomy (8 bones) in Group 2 (n=4). One month later the rabbits were sacrificed. Bone healing of the rabbits was staged according to the bone healing score of Huddleston et al. In both groups, nasal bone integrity was assessed subjectively.

Results: In the percutaneous osteotomy group, Grade 1 bone healing was observed in two samples (25%), Grade 2 bone healing in two samples (25%), Grade 3 bone healing in four samples (50%). In the endonasal osteotomy group, Grade 1 bone healing was observed in 6 samples (75%) and Grade 2 bone healing was observed in 2 samples (25%). In the percutaneous group, fibrous tissue was observed in 2, predominantly fibrous tissue and a lesser amount of cartilage was

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observed in 2 and an equal amount of fibrous tissue and cartilage was observed in 4 samples. In the endonasal group, fibrous tissue was observed in 6 samples, and predominantly fibrous tissue with a lesser amount of cartilage was observed in 2 samples. In both groups, when manual force was applied to the nasal bones, subjectively the same resistance was observed.

Conclusion: Percutaneous lateral osteotomy technique was found to result in less bone and periosteal trauma and better bone healing compared to the endonasal osteotomy technique.

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PALAVRAS-CHAVE

Osteotomia endonasal;
Osteotomia percutânea;
Rinoplastia;
Modelo animal

Comparação histopatológica dos efeitos da cicatrização óssea entre as técnicas de osteotomia lateral endonasal e percutânea em modelo de rinoplastia em coelhos

Resumo

Introdução: A osteotomia lateral, é realizada principalmente por via endonasal ou percutânea nas rinoplastias, as quais são frequentemente realizadas para correção de deformidades nasais. Ambas as técnicas têm vantagens e desvantagens quando comparadas entre si.

Objetivo: O objetivo deste estudo foi comparar os efeitos histopatológicos sobre a cicatrização óssea e estabilidade nasal entre as técnicas de osteotomia endonasal e percutânea em rinoplastia em um modelo animal experimental.

Método: Foram incluídos oito coelhos brancos da Nova Zelândia de um ano de idade. Hidrocloro de xilazina e cetamina intramuscular foram administrados aos coelhos como agentes anestésicos. Osteotomia endonasal (8 ossos) foi realizada no Grupo 1 (n=4) e osteotomia percutânea (8 ossos) no Grupo 2 (n=4). Um mês depois, os coelhos foram sacrificados. A cicatrização óssea dos coelhos foi avaliada de acordo com o escore de cicatrização óssea de Huddleston et al. Em ambos os grupos, a integridade do osso nasal foi avaliada subjetivamente.

Resultados: No grupo da osteotomia percutânea, observou-se cicatrização óssea de grau 1 em duas amostras (25%), cicatrização óssea de grau 2 em duas amostras (25%), e cicatrização óssea de grau 3 em quatro amostras (50%). No grupo da osteotomia endonasal, observou-se cicatrização óssea de grau 1 em 6 amostras (75%) e a cicatrização óssea de grau 2 foi observada em 2 amostras (25%). No grupo percutâneo, o tecido fibroso foi observado em 2 amostras, enquanto tecido predominantemente fibroso e uma menor quantidade de cartilagem foi observada em 2 e uma quantidade igual de tecido fibroso e cartilagem foi observada em 4 amostras. No grupo endonasal, observou-se tecido fibroso em 6 amostras e observou-se tecido predominantemente fibroso com uma menor quantidade de cartilagem em 2 amostras. Em ambos os grupos, quando força manual foi aplicada aos ossos nasais, a mesma resistência foi observada subjetivamente.

Conclusão: A técnica de osteotomia lateral percutânea resultou em menos traumatismo ósseo e ao periosteio e melhor cicatrização óssea em comparação com a técnica de osteotomia endonasal.

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Introduction

Rhinoplasty is a frequently performed operation for the correction of nasal deformities. Lateral osteotomies are usually performed at the final stage of esthetic surgery.¹ Because osteotomies are not performed under direct visual observation but by feeling tactile stimulation, they carry the risk of damaging the mucosa, the supporting tissues and the periosteum.² Ideal osteotomy should be reproducible, predictable and be able to produce definite results with good functional outcomes, and soft tissue damage should be minimal.³ Lateral osteotomy may cause excessive damage

to the intranasal mucosa and periosteum, increased bleeding, excessively mobilized nose, excessive edema, increased ecchymoses, and excessive narrowing of the nose.⁴ The lateral osteotomy performed after the hump resection corrects the open roof deformities, the curved lateral nasal wall and the broad nasal base.⁵ The lateral osteotomy is mainly performed either endonasally or percutaneously. Both techniques have both advantages and disadvantages relative to each other.

The rabbit nasal bone is thinner and elongated than the human nasal bone. In rabbit facial anatomy, both nasal bones fuses to form roof of nasal cavity and forms the dorsal border

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