The Long Term Stability of the Le Fort I Osteotomy

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Abstract

The Le Fort I osteotomy is a surgical procedure designed to correct certain types of maxillary deformities. It enables the maxilla to be repositioned within certain limits in three dimensions. These shifts can be performed leaving the maxillary arch intact or the arch can be cut into segments and expanded or compressed. Bone grafts may or may not be required. The procedure has gained world wide acceptance and has been widely performed over the last three decades . It was however first described last century. The maxilla is shifted into a preplanned position and fixated via various methods, however over a period of time relapse has been shown to occur.

The aim of this research was to measure relapse and to identify the factors that influence relapse over a long period of time (minimum of one year). The incidence and timing of relapse has been documented in many studies. These have largely been conflictive and inconclusive. Most of these studies have been of short duration.

The research is a retrospective study based on cephalometric analysis of pre and post operative radiographs to determine the extent of relapse. Patients who had undergone a Le Fort I osteotomy in the period 1984 to 1997 at the Royal Adelaide Hospital were included if they had a complete set of lateral cephalograms and other records greater than one year post surgery. Out of 287 patients undergoing this procedure, 100 fulfilled these requirements.

Utilising a standardised approach these cephalograms were analysed to determine changes in the maxillae from pre to post surgery, and then post surgery to greater than one year. This quantified the amount and direction of movement with the original surgery and also any long term post surgical

instability.

After a review of the literature various factors that may influence the stability of the surgery were identified. These included whether orthodontics were utilised or not, the direction of movement, the magnitude of movement, concurrent mandibular surgery, the type of fixation, the use of bone grafts, and segmental versus non segmental treatments. The age, sex and growth status of the patient were also assessed for their influence on stability, as was the experience of the surgeon performing the operation.

A close examination of the errors of method was undertaken and discussed. This identified limitations that are inherent in this form of study. The major factors identified and addressed were accurate landmark identification.

This study showed that all Le Fort I osteotomies have a degree of post surgical instability. As has been found in other short term studies the direction of maxillary movement altered the amount of instability post surgery. Advancement osteotomies are more stable than the superior repositioned maxilla, which in turn are more stable than the inferior repositioned maxilla.

The occurrence of the instability was within the first twelve months after the operation was performed. After minor early instability the Le Fort I osteotomy can be considered stable in the long term.

Instability with superior repositioning can occur either in a further superior direction or relapse in an inferior direction. Identification of aetiological factors that may aid the recognition of the patients in each of these groups prior to surgery was not achieved.

No significant difference in stability could be assigned to age or gender. Whether orthodontic treatment was performed or not had no influence on the stability of the Le Fort I osteotomy. The type of fixation used at surgery generally had no bearing on the amount of post-surgical instability. In the inferiorly repositioned group there was a slight improvement in stability when bone plates were used rather than intra-osseous wiring.

Bone graft use, growth in the patient, and the experience of the surgeon performing the Le Fort I osteotomy had no effect on the amount of long term stability. Concurrent mandibular osteotomies performed with the maxillary osteotomy also had no influence on the long term stability of the Le Fort I procedure. Segmentalised maxillae, either for transverse or vertical discrepancies in the maxilla, had similar relapse rates as one piece maxillary osteotomies.

This study confirms that the Le Fort I osteotomy is versatile, robust and essentially stable.

Declaration

This thesis is submitted in partial fulfilment of the requirements for the degree of Master of Dental Surgery. I declare that the text of this thesis has not been previously published or written by another person except where due reference is made. The findings are the results of my personal investigations. No part of this work has been previously submitted for a degree in any University.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

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