



The Long Term Stability of the Le Fort I Osteotomy

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Table of Contents

Title.....	i
Table of Contents.....	ii
List of Figures.....	ix
List of Tables.....	x
Abstract.....	xxi
Declaration.....	xxiv
Acknowledgements.....	xxv
I Introduction.....	1
Chapter 1 The Le Fort I osteotomy for the correction of the maxillary position in three dimensions.....	2
1.1 Overview and Aims.....	2
II Review of the Literature.....	4
Chapter 2 Dentofacial discrepancies involving the maxilla.....	5
2.1 History.....	5
2.2 Classifications of maxillary discrepancies.....	7
2.3 Incidence.....	10
2.4 Maxillary growth -normal growth of the maxilla.....	11

2.5 Surgery for the treatment of maxillary discrepancies.....	15
2.5.1 South Australian Protocol.....	19
2.6 Bone grafting.....	25
2.7 Complications of maxillary procedures.....	28
2.7.1 Intraoperative complications.....	28
2.7.2 Immediate post operative complications.....	36
2.7.3 Delayed post operative complications.....	39
Chapter 3 Cephalometry.....	44
3.1 Introduction.....	44
3.2 Errors of projection.....	47
3.3 Errors of landmark identification.....	49
3.4 Errors of superimposition.....	52
3.5 Errors of digitising.....	55
3.6 Errors of measurement.....	57
3.7 Selection of a suitable line of reference.....	58
Chapter 4 Relapse following Le Fort I osteotomy.....	63
4.1 Defining post surgical relapse.....	63
4.2 Measurement of post surgical relapse.....	63
4.3 Early, intermediate and long term relapse.....	66

Chapter 5 Factors associated with post surgical relapse following Le Fort I osteotomy.....	68
5.1 Introduction.....	68
5.2 Orthodontics and occlusion.....	70
5.3 Direction of repositioning the maxilla.....	73
5.4 Magnitude of shift of the maxilla.....	179
5.5 Influence of bimaxillary surgery.....	80
5.6 Plating verses wire fixation.....	83
5.7 Bone grafting and stability.....	90
5.8 Segmental vs single piece osteotomy.....	93
5.9 Anterior Open Bite.....	94
5.10 Muscular interactions.....	96
5.11 Vascular considerations of osseous segments.....	100
5.12 Growth and Stability.....	101
5.13 Le Fort III / Syndromal patients / Cleft palate patients.....	104
5.14 Conclusion.....	107
 Chapter 6 Biomechanics of fixation.....	 108
 III Materials and Method.....	 113
 Chapter 7 Evaluation of post surgical relapse.....	 114
7.1 Selection of patients records.....	114

7.2 Radiographic technique.....	117
7.3 Tracing and digitising procedure.....	120
7.4 Reference points and lines.....	122
7.4.1 Hard and soft tissue points.....	122
7.4.2 Cephalometric lines.....	126
7.4.3 Calculation of linear and angle variables.....	126
7.5 Statistical analysis.....	129
Chapter 8 Errors of Method.....	131
8.1 Errors of Method.....	131
IV Results.....	134
Chapter 9 Early, intermediate and long term dentoskeletal effect following Le Fort I osteotomy.....	135
9.1 Introduction.....	135
9.2 Demographics.....	136
9.3 Analysis of variables by group.....	143
9.3.1 Superior repositioning of the Maxilla.....	143
9.3.1.1. Points A, ANS , PNS and MAX.....	143
9.3.2 Inferior repositioning of the Maxilla.....	166
9.3.2.1. Points A, ANS , PNS.....	166
9.3.3 Anterior repositioning of the Maxilla.....	186
9.3.3.1. Points A, ANS , PNS.....	186

9.3.4 Points UMC and LMC (In the vertical and Horizontal).....	206
9.3.5 SNA and Frankfort horizontal (For each direction of movement).....	213
9.3.6 Anterior facial height : Nasion to Menton (Na - Me) for each direction of movement	219
9.3.7 Posterior facial height (S - Go) for each direction of movement.....	223
9.4 Dentoskeletal changes.....	227
9.4.1 Maxillary incisal angle.(SNA - Max).....	227
9.4.2 Interincisal angle.....	231
9.4.3 Overjet.....	235
9.4.4 Overbite.....	239
9.5 Influence of mandibular surgery.....	243
9.5.1 Angle SNB.....	243
9.5.2 Influence of mandibular surgery.....	247
9.6 Influence of occlusal plane (Occlusal plane to Frankfort horizontal).....	251
9.7 Other factors.....	255
9.7.1. Single jaw surgery (Maxilla only) vs Bimaxillary surgery.....	255
9.7.2. Early relapse vs late relapse.....	261
9.8 Complications following surgery.....	267
9.8.1. intraoperative haemorrhage.....	267

9.8.2. immediate post operative complications.....	268
9.8.3. delayed post operative complications.....	269
9.8.3.1 Parathesia of the infraorbital nerve.....	269
9.8.3.2. Infections.....	269
9.8.3.3. Plate removal.....	270
9.8.3.4. TMJ disorders.....	270
9.8.3.4. Dental complications.....	270
Chapter 10 Results : Errors of the method.....	271
V Discussion.....	285
Chapter 11 Discussion of Experimental Design.....	286
11.1 Patient selection.....	286
11.2 Materials and method.....	288
Chapter 12 Discussion of factors in the relapse of Le Fort I osteotomy.....	291
12.1 Definition of relapse.....	291
12.2 Orthodontics and occlusion.....	292
12.2.1 Orthodontics versus no orthodontics.....	292
12.2.2 Orthodontics - overjet and overbite.....	294
12.2.3 Orthodontics - Maxillary incisal angle and interincisal angle.....	295
12.2.4 Orthodontics - Occlusal plane angle.....	297

viii

12.2.5 Orthodontics - Upper molar and lower molar
crown position.....298

12.3 Magnitude and direction of movement.....301

12.4 Type of fixation.....305

 12.4.1 Fixation.....305

 12.4.2 Bone grafts.....306

12.5 Growth.....308

12.6 Surgeon.....310

12.7 Segmentalisation of the maxilla vs one piece.....311

12.8 Influence of mandibular surgery.....313

12.9 Gender.....314

12.10 Relapse timing.....315

VI Conclusion.....316

Chapter 13 Conclusion.....317

VII Appendix.....319

I Bone grafts - Anterior Iliac Crest (surgical technique).....320

II. Le fort I Osteotomy - surgical technique.....322

III. Bone Plate removal protocol statement.....329

VIII Bibliography.....330

List of Figures.

Figure 2.1 Le Fort osteotomy levels.....	17
Figure 3. 1 Reference lines.....	59
Figure 5.1 Diagram hierarchy of stability.....	74
Figure 7.1 Enlargement factor : Adelaide Dental Hospital Lateral Cephalogram.....	119
Figure 7.2 Hard tissue points listed in order of digitising sequence.....	125
Figure 7.3 Angular and linear variables used to evaluate dentoskeletal changes following Le Fort I osteotomies (and concurrent Mandibular procedures).....	128
Figure 7.4 Summary of statistics used.....	130
Figure 8.1 Statistical analysis of the experimental error.....	133
Figure 9.1 Scatter plot of maxillary landmarks for superior repositioning.....	145
Figure 9.2 Scatter plot of maxillary landmarks for inferior repositioning.....	167
Figure 9.3 Scatter plot of maxillary landmarks for anterior repositioning.....	187
Figures 10.1 - 10.21. Double determinations for cephalometric landmarks used.....	274 -284

List of Tables.

Table 9.1 Age and gender distribution of patients undergoing surgery	136
Table 9.2 Age and gender distribution of patients who underwent surgery but had incomplete records.....	136
Table 9.3 Age and gender distribution of patients who underwent surgery who were syndromal patients.....	137
Table 9.4 Distribution of patients involved in the study assigned by direction of maxillary movement.....	137
Table 9.5 Distribution of patients assigned by direction of maxillary movement whose records were incomplete.....	138
Table 9.6 Distribution of patients assigned by direction of maxillary movement who were syndromal patients.....	138
Table 9.7 Distribution of patients by direction of movement and concurrent mandibular surgery.....	139
Table 9.8 Distribution of patients by direction of movement and concurrent mandibular surgery (Combining groups 2 & 5 ; groups 3 & 4 from Table 9.7).....	139
Table 9.9 Distribution of patients by direction of movement and surgeon.....	140
Table 9.10. Patient numbers receiving pre/post-surgical or no orthodontics by direction.....	141
Table 9.11. Number of patients having segmental/non segmental Le fort I operations by direction.....	141
Table 9.12. Magnitude of movement by direction.....	141
Table 9.13. Patient numbers using either wire or rigid fixation by direction.....	142
Table 9.14. Patient numbers using bone grafts or no graft by direction.....	142
Table 9.15. Mean maxillary impaction (mm).....	143

Table 9.16. T -Test : Superiorly repositioned maxilla.....	144
Table 9.17. Correlations - superiorly repositioned maxilla (Pearson Correlations.....	145
Table 9.18. Magnitude of shift in superior direction and postsurgical movement by gender.....	146
Table 9.19. Magnitude of shift in superior direction and postsurgical movement by gender ANOVA	147
Table 9.20. Magnitude of shift in superior direction and postsurgical movement by age.....	149
Table 9.21. Magnitude of shift in superior direction and postsurgical movement by age -ANOVA.....	150
Table 9.22. Magnitude of shift in superior direction and postsurgical movement by surgeon.....	152
Table 9.23. Magnitude of shift in superior direction and postsurgical movement by surgeon - ANOVA.....	153
Table 9.24. Magnitude of shift in superior direction and postsurgical movement by operation.....	154
Table 9.25. Magnitude of shift in superior direction and postsurgical movement by operation - ANOVA.....	155
Table 9.26. Movement in the superior direction and postsurgical movement by segmentalisation (Seg.) versus one piece maxilla (Nonseg.).	156
Table 9.27. Magnitude of shift in superior direction and postsurgical movement when segmentalised or one piece -ANOVA.....	157
Table 9.28. Movement in the superior direction and postsurgical movement by wire or rigid fixation (R.F.).....	158
Table 9.29. Movement in the superior direction and postsurgical movement fixated with wire or rigid fixation -ANOVA.....	159

Table 9.30. Movement in the superior direction and postsurgical movement by orthodontics or no orthodontics.....160

Table 9.31. Movement in the superior direction and postsurgical movement by orthodontics or no orthodontics ANOVA.....161

Table 9.32. Movement in the superior direction and postsurgical movement by the magnitude of movement.....162

Table 9.33. Movement in the superior direction and postsurgical movement by the magnitude of that movement. -ANOVA.....163

Table 9.34. Movement in the superior direction and postsurgical movement by bone graft or no bone graft.....165

Table 9.35. Movement in the superior direction and postsurgical movement by bone graft or no bone graft - ANOVA.165

Table 9.36. Mean maxillary inferior repositioning (mm).....166

Table 9.37. T -Test : Inferiorly repositioned maxilla.....166

Table 9.38. Correlations - inferiorly repositioned maxilla (Pearsons Correlations).....167

Table 9.39. Magnitude of shift in the inferior direction and postsurgical movement by gender.....168

Table 9.40. Magnitude of shift in the inferior direction and postsurgical movement by gender - ANOVA.....169

Table 9.41. Magnitude of shift in the inferior direction and postsurgical movement by age.....170

Table 9.42. Magnitude of shift in the inferior direction and postsurgical171

Table 9.43. Magnitude of shift in the inferior direction and postsurgical movement by surgeon.....172

Table 9.44. Magnitude of shift in the inferior direction and postsurgical movement by surgeon - ANOVA.....173

Table 9.45. Magnitude of shift in the inferior direction and postsurgical movement by operation.....	174
Table 9.46. Magnitude of shift in the inferior direction and postsurgical movement by operation. - ANOVA.....	175
Table 9.47. Movement in the inferior direction and postsurgical movement by segmentalisation (Seg.) versus one piece maxilla (Nonseg.).....	176
Table 9.48. Magnitude of shift in inferior direction and postsurgical movement when segmentalised or one piece - ANOVA.....	177
Table 9.49. Movement in the inferior direction and postsurgical movement by wire or rigid fixation (R.F.).	178
Table 9.50. Movement in the inferior direction and postsurgical movement fixated with wire or rigid fixation - ANOVA.....	179
Table 9.51. Movement in the inferior direction and postsurgical movement by orthodontics or no orthodontics.....	180
Table 9.52. Movement in the inferior direction and postsurgical movement by orthodontics or no orthodontics. - ANOVA.....	181
Table 9.53. Movement in the inferior direction and postsurgical movement by the magnitude of movement.....	182
Table 9.54. Movement in the inferior direction and postsurgical movement by the magnitude of that movement. - ANOVA.....	183
Table 9.55. Movement in the inferior direction and postsurgical movement by bone graft or no bone graft.....	184
Table 9.56. Movement in the inferior direction and postsurgical movement by bone graft or no bone graft. - ANOVA.....	185
Table 9.57. Mean maxillary advancement (mm).	186
Table 9.58. T -Test : Anteriorly repositioned maxilla.....	186

Table 9.59. Correlations - anteriorly repositioned maxilla (Pearsons Correlations.).....	187
Table 9.60. Magnitude of shift in the anterior direction and postsurgical movement by gender.....	188
Table 9.61. Magnitude of shift in the anterior direction and postsurgical movement by gender - ANOVA.....	189
Table 9.62. Magnitude of shift in the anterior direction and postsurgical movement by age.....	190
Table 9.63. Magnitude of shift in the anterior direction and postsurgical movement by age - ANOVA.....	191
Table 9.64. Magnitude of shift in the anterior direction and postsurgical movement by surgeon.....	192
Table 9.65. Magnitude of shift in the anterior direction and postsurgical movement by surgeon - ANOVA.....	193
Table 9.66. Magnitude of shift in the anterior direction and postsurgical movement by operation.....	195
Table 9.67. Movement in the anterior direction and postsurgical movement by operation - ANOVA.....	195
Table 9.68. Movement in the anterior direction and postsurgical movement by segmentalisation (Seg.) versus one piece maxilla (Nonseg.).....	196
Table 9.69. Magnitude of shift in the anterior direction and postsurgical movement when segmentalised or one piece - ANOVA.....	197
Table 9.70. Movement in the anterior direction and postsurgical movement by wire or rigid fixation (R.F.).....	198
Table 9.71. Movement in the anterior direction and postsurgical movement fixated with wire or rigid fixation ANOVA.....	199

Table 9.72. Movement in the anterior direction and postsurgical movement by orthodontics or no orthodontics.....200

Table 9.73. Movement in the anterior direction and postsurgical movement by orthodontics or no orthodontics. - ANOVA.....201

Table 9.74. Movement in the anterior direction and postsurgical movement by the magnitude of movement.....202

Table 9.75. Movement in the anterior direction and postsurgical movement by the magnitude of that movement. - ANOVA.....203

Table 9.76. Movement in the anterior direction and postsurgical movement by bone graft or no bone graft.....205

Table 9.77. Movement in the anterior direction and postsurgical movement by bone graft or no bone graft. - ANOVA.....205

Table 9.78. Mean movement of points LMC and UMC in the horizontal (X) and vertical (Y) planes for superior repositioning206

Table 9.79. T -Test for points UMC and LMC for superior repositioning.....207

Table 9.80. Mean movement of points LMC and UMC in the horizontal (X) and vertical (Y) planes for inferior repositioning208

Table 9.81. T -Test for points UMC and LMC for inferior repositioning.....209

Table 9.82. Mean movement of points LMC and UMC in the horizontal (X) and vertical (Y) planes for anterior repositioning210

Table 9.83. T -Test for points UMC and LMC for advancement.....211

Table 9.84. Movement in each direction and postsurgical movement at points UMC, LMC in both the vertical (Y) and horizontal (X) - ANOVA.....212

Table 9.85. Mean angle SNA and mean Frankfort horizontal
(NA - FH) for superior repositioning.....213

Table 9.86. T -Test for angles SNA and NA-FH for superior repositioning.....214

Table 9.87. Mean angle SNA and mean Frankfort horizontal
(NA - FH) for inferior repositioning.....215

Table 9.88. T -Test for angles SNA and NA-FH for inferior repositioning.....216

Table 9.89. Mean angle SNA and mean Frankfort horizontal
(NA - FH) for anterior repositioning.....217

Table 9.90. T -Test for angles SNA and NA-FH for anterior repositioning.....218

Table 9.91. Anterior facial height (Na - Me) for superior
repositioning (mm.)219

Table 9.92. T -Test for anterior facial height for superior repositioning.....220

Table 9.93. Anterior facial height (Na - Me) for inferior
repositioning (mm.)220

Table 9.94. T -Test for anterior facial height for inferior repositioning.....221

Table 9.95. Anterior facial height (Na - Me) for anterior
repositioning (mm.).....221

Table 9.96. T -Test for anterior facial height for anterior repositioning.....222

Table 9.97. Posterior facial height (S - Go) for superior
repositioning (mm.).....223

Table 9.98. T -Test for posterior facial height for superior repositioning.....224

Table 9.99. Posterior facial height (S - Go) for inferior
repositioning (mm.)224

Table 9.100. T -Test for posterior facial height for inferior repositioning.....225

Table 9.101. Posterior facial height (S - Go) for anterior
repositioning (mm.).....225

Table 9.102. T -Test for posterior facial height for anterior repositioning.....226

Table 9.103. Mean maxillary incisal angle (SN - Max) for superior repositioning.....227

Table 9.104. T -Test for maxillary incisal angle for superior repositioning.....228

Table 9.105. Mean maxillary incisal angle (SN - Max) for inferior repositioning228

Table 9.106. T -Test for maxillary incisal angle for inferior repositioning.....229

Table 9.107. Mean maxillary incisal angle (SN - Max) for advancement.....230

Table 9.108. T -Test for maxillary incisal angle for advancement230

Table 9.109. Mean interincisal angle for superior repositioning.....231

Table 9.110. T -Test for interincisal angle for superior repositioning.....232

Table 9.111. Mean interincisal angle for inferior repositioning.232

Table 9.112. T -Test for interincisal angle for inferior repositioning.....233

Table 9.113. Mean interincisal angle for advancement.234

Table 9.114. T -Test for interincisal angle for advancement.....235

Table 9.115. Mean overjet (mm.) for superior repositioning.....235

Table 9.116. T -Test for overjet for superior repositioning.....236

Table 9.117. Mean overjet for inferior repositioning236

Table 9.118. T -Test for overjet for inferior repositioning.....237

Table 9.119. Mean overjet for advancement.....237

Table 9.120. T -Test for overjet for advancement238

Table 9.121. Mean overbite (mm.) for superior repositioning.....239

Table 9.122. T -Test for overbite for superior repositioning.....240

Table 9.123. Mean overbite (mm.) for inferior repositioning.240

Table 9.124. T -Test for overbite for inferior repositioning.....241

Table 9.125. Mean overbite (mm.) for advancement.242

Table 9.126. T -Test for overbite for advancement242

Table 9.127. Mean SNB angle for superior repositioning.....243

xviii

Table 9.128. T -Test for SNB angle for superior repositioning.....	244
Table 9.129. Mean SNB for inferior repositioning.	244
Table 9.130. T -Test for angle SNB for inferior repositioning.....	245
Table 9.131. Mean angle SNB for advancement.....	245
Table 9.132. T -Test for angle SNB for advancement	246
Table 9.133. Mean mandibular plane angle (MPA) for superior repositioning	247
Table 9.134. T -Test for mandibular plane angle for superior repositioning....	248
Table 9.135. Mean mandibular plane angle for inferior repositioning	248
Table 9.136. T -Test for mandibular plane angle for inferior repositioning.....	249
Table 9.137. Mean mandibular plane angle for advancement	249
Table 9.138. T -Test for mandibular plane angle for advancement.....	250
Table 9.139. Mean occlusal plane angle for superior repositioning.....	251
Table 9.140. T -Test for occlusal plane angle for superior repositioning.....	252
Table 9.141. Mean occlusal plane angle for inferior repositioning.....	252
Table 9.142. T -Test for occlusal plane angle for inferior repositioning.....	253
Table 9.143. Mean occlusal plane angle for advancement.....	253
Table 9.144. T -Test for occlusal plane angle for advancement	254
Table 9.145. Single jaw surgery (Le fort only) versus two jaw surgery (Others) for superiorly repositioned maxillae	255
Table 9.146. Single jaw surgery (Le fort only) versus two jaw surgery (Others) for superiorly repositioned maxillae before and after surgery utilising points A, ANS and PNS -ANOVA.....	256
Table 9.147. Single jaw surgery (Le fort only) versus two jaw surgery (Others) for inferiorly repositioned maxillae.....	257

xix

Table 9.148. Single jaw surgery (Le fort only) versus two jaw surgery (Others) for inferiorly repositioned maxillae before and after surgery utilising points A, ANS and PNS - ANOVA.....	258
Table 9.149. Single jaw surgery (Le fort only) versus two jaw surgery (Others) for anteriorly repositioned maxillae.....	259
Table 9.150. Single jaw surgery (Le fort only) versus two jaw surgery (Others) for anteriorly repositioned maxillae before and after surgery utilising points A, ANS and PNS - ANOVA.....	260
Table 9.151. Comparison of patients followed up for less than average time (2.6 years) and those followed up longer . Examines patients before and after surgery utilising points A, ANS , PNS and MAX. Superior repositioning.....	261
Table 9.152. Comparison of patients followed up for less than average time (2.6 years) and those followed up longer. Superior repositioning - ANOVA.....	262
Table 9.153. Comparison of patients followed up for less than average time (2.6 years) and those followed up longer . Examines patients before and after surgery utilising points A, ANS , PNS and MAX. Inferior repositioning.....	263
Table 9.154. Comparison of patients followed up for less than average time (2.6 years) and those followed up longer. Inferior repositioning - ANOVA.....	264
Table 9.155. Comparison of patients followed up for less than average time (2.6 years) and those followed up longer . Examines patients before and after surgery utilising points A, ANS , PNS and MAX. Anterior repositioning.....	265

XX

Table 9.156. Comparison of patients followed up for less than average time (2.6 years) and those followed up longer. Anterior repositioning - ANOVA.....	266
Table 9.157. Complication rates for the 100 patients undergoing Le Fort I osteotomies.....	267
Table 10.1 Error for 20 hard tissue points (Horizontal axis) by Double determination.....	272
Table 10.2 Error for 20 hard tissue points (Vertical axis) by Double determination.....	273

xxi
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.

xxiii

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.

xxiv
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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