



Cairo University
Faculty of Oral and Dental Medicine

CLINICAL AND RADIOGRAPHIC ASSESSMENT
OF EFFICACY OF RESORBABLE VERSUS
NON-RESORBABLE POSITIONAL SCREW
OSTEOSYNTHESIS FOR BILATERAL
SAGITTAL SPLIT RAMUS
OSTEOTOMY (B.S.S.R.O.)

Thesis

Submitted to Oral Surgery Department in the partial fulfillment
of the requirements for Doctors degree in oral surgery

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**تقييم إكلينيكي و شعاعي للمقارنة بين براغي التيتانيوم
و البراغي ذاتية الإمتصاص في تثبيت الفلق السهمي
لفرعي الفك السفلي
(دراسة سريرية)**

رسالة مقدمة من

الطبيب / تامر هلال فرحات

توطئة للحصول على درجة الدكتوراه في جراحة الفم

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَأَنْزَلَ اللَّهُ عَلَيْكَ الْكِتَابَ

وَالْحِكْمَةَ وَعَلَيْكَ مَا لَمْ تُكُنْ تَعْلَمُ

وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا

عَنْ رَسُولِ اللَّهِ الْعَظِيمِ

سورة النساء آية ١١٣

Abstract

Key words: Resorbable screws B.S.S.R.O. sagittal split mandibular osteotomy

Introduction:

The bilateral sagittal split ramus osteotomy is now known to be a versatile method for correction of different mandibular deformities. However the type of osteotomy fixation and its relation to postoperative skeletal relapse continues to be a common postoperative debate. Internal fixation using titanium hardware became the gold standard despite its possible need for its removal requiring a second surgery due to possible complications including unacceptable palpability or looseness, intraoral exposure, thermal and dental sensitivity, passive migration and growth disturbance, distortion of future CT and MRI images as well as allergic reactions in rare instances. Recently after the introduction and refinement of biodegradable plates and screws it was encouraging to use them in fractures fixation as well as orthognathic surgeries including B.S.S.R.O. The aim of this Study is to evaluate the long term stability(1year)of B.S.S.R.O. using resorbable versus titanium positional screws rigid osteosynthesis

Patients and methods:.

Fourteen patients included in our study were divided equally into two groups underwent BSSRO under G.E.T.I. Preoperative preparations in the form of photographs, mounted models on SAMII articulator, clinical and radiographic examinations (panorex & lat. ceph) were carried out for every patient. In the first group the osteotomies were fixed with three 2.3mm titanium positional screws, while 2.5mm screws were used in the second group after proper tapping according to the manufacturer's instructions. Panorex and lat. ceph were repeated immediately postoperative, and after twelve months. Preoperative and postoperative lat. cephs were digitally traced by facial computer digitizer software Onyx Ceph 2.6 and the results were statistically analyzed to study and compare postoperative relapse between the two groups.

Results:

Group I: The age ranged from 18-35 years with a mean of 24.43 SD $\pm$ 5.97, four of them were males and three were females. Five patients underwent setback that ranged from 7 to 23 mm, one patient underwent mandibular advancement 8 mm, while one patient had her laterognathia corrected.

Group II: The age ranged from 14-31 years with a mean of 23.57 SD $\pm$ 5.38. four of them were males and three were females. Six patients underwent mandibular setback that ranged from 5 to 17 mm and one patient underwent mandibular advancement 7 mm. Splitting of all osteotomies were consistent in all cases with no unfavorable fractures or inferior alveolar nerve severance. In five osteotomies the nerve was seen uncovered, while it was completely covered by bone in the rest of them. No patients had any signs or symptoms of infection or wound dehiscence. Nine patients complained of immediate postoperative unilateral paresthesia or anaesthesia, while immediate paresthesia or anaesthesia were bilateral in two patients. Seven patients regained normal lip sensations in the first three months, two by the end of six months, while two continued to improve until the end of the first year but didn't recover completely. One case in group I required removal of the screws ten months postoperative due to patient's complaint of discomfort as the screws became palpable extraorally. No patients in group II showed neither any erythema, abnormal oedema, pain, sterile abscess or fistula formation nor any abnormal mucosa healing pattern at the screw sites. Statistically there was no significant difference in the mean $\pm$ SD of % of relapse comparing group I to group II

Discussion:

In our study no patients in the resorbable screws group showed any abnormal erythema, oedema, pain, sterile abscess or fistula formation or any abnormal healing pattern of the mucosa over the screws sites. There was no significant difference regarding relapse in both groups. These findings are consistent with the vast majority of similar studies. However some complications have been reported in the literature. Since most surgeons as we do, do not advocate the routine removal of titanium fixation hardware, it could be premature to recommend the habitual and routine application of resorbable fixation bearing in mind the technical and mechanical disadvantages compared to titanium. Additional disadvantages could include the technique sensitivity, length of learning curve, slightly increased screw diameter, difficulty in intraoperative removal in case repositioning is needed, lack of presence of emergency screws if needed, lack of radiopacity, inability of resterilization, having an expiry date in addition to the increased cost. However the price factor could be negotiable if a second surgery for titanium hardware removal could be avoided with no psychological or surgical risk and morbidity.

Conclusion:

1. Both titanium and resorbable screws proved effective in controlling vertical & horizontal mandibular relapse after BSSRO.
2. Resorbable screws could eliminate the need for a second surgery usually needed for titanium screws removal with corresponding patient's suffer, surgical and anaesthetic risk as well as additional cost.
3. Resorbable screws still have the following disadvantages :
 - *Technique sensitivity, learning curve requirement and increased time consumption*
 - *Increased screw diameter needed to obtain comparative strength to that of titanium screws which might increase the risk of neurovascular nerve injury.*
 - *Difficulty in screw removal if the head breaks*
 - *Difficulty in screw repositioning intraoperatively if needed.*
 - *Lack of emergency screws and resterilization if needed*
 - *Expiry date that might interfere with storage & stocking*
 - *Increased cost compared to titanium which could be neglected as the cost of a second surgery could be spared.*

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AIM OF STUDY

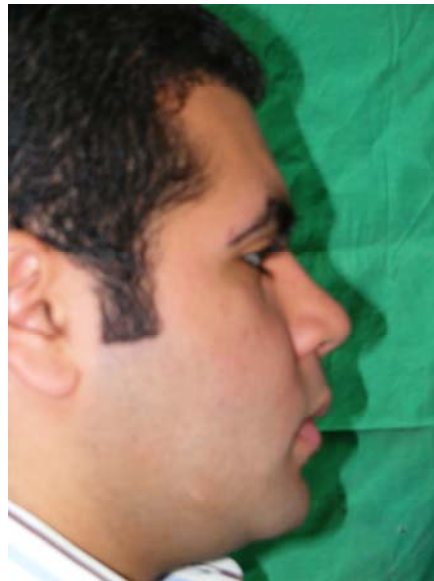
The aim of the Study is to evaluate the long term stability (1year) of B.S.S.R.O. using resorbable versus titanium positional screws rigid osteosynthesis.

(Mandibular Prognathism)

Preoperative



postoperative

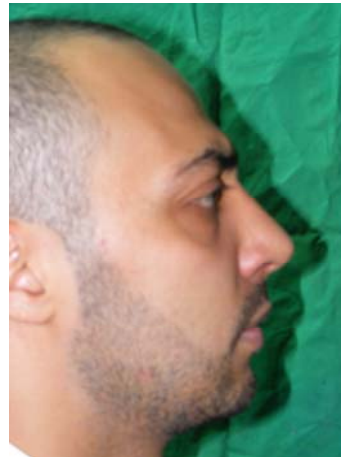
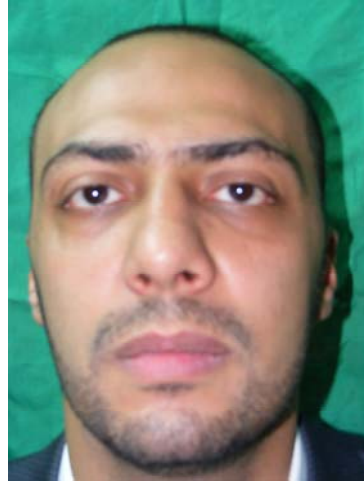


(Mandibular deficiency)

Preoperative



postoperative



(Mandibular prognathism)

Preoperative



postoperative



(Mandibular proghathism)

Preoperative



postoperative



(Mandibular Prognathism)

Preoperative

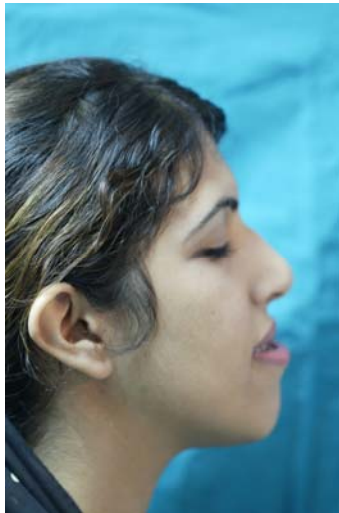


postoperative



(Mandibular laterognathia)

Preoperative



postoperative



(Mandibular Prognathism)

Preoperative



postoperative

