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RESEARCH ARTICLE

MINIMALLY INVASIVE ORTHOGNATHIC SURGERY

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Abstract

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Introduction:-

Knowledge and understanding of all aspects of orthognathic surgery has fully grown significantly throughout the past 20 years. The concern of foundering surgical knife has forever deterred some patients from surgery; however, the conception of Minimally Invasive surgery (MIS) is changing this conception. MIS involves the modification of operative designing, intraoperative techniques, instruments, and operative care. Hunter in the year 1999 observed that the procedure diminishes the postoperative sequelae associated with the conventional procedure¹. The incidence rate of the tissue trauma, swelling and haemorrhage is less with the minimally invasive procedure. It conjointly improves the speed and quality of the healing².

Orthognathic surgery gave new and exciting choice to patients with dentofacial deformities and provided the dentist with choices apart from compromised treatment for patients with skeletal deformity. Minimal or non-invasive orthognathic surgery provides higher aesthetic and stable results as compared to the conventional procedure. Modification of the 'wide-open' typical approach towards short incisions and borderline dissection allows the sawbones to perform procedures in an exceedingly gentler manner, to cut back complications, and facilitates a quicker recovery³. The evidence-based literature supports this approach as an important tool of MIS as benefits of endoscopy include small and remotely placed incisions, acceptable scars and direct visualization of an illuminated and magnified operative field. Minimal Dissection results decreased pain and swelling, less overall morbidity and faster recovery. For these reasons, minimally invasive surgery has gained enthusiastic public acceptance¹. Kostecka in 1931, was the primary person to explain the minimally invasive orthognathic surgery⁴.

In orthognathic surgery (1) endoscopic exposure and (2) Distraction Osteogenesis (DO) are the two procedure which can be done alone or in combination with each other.

The three popularized minimally invasive mandibular orthognathic procedures include:

- (1) Treatment of mandibular prognathism or asymmetry treated with endoscopic vertical ramus osteotomy instead of intra oral vertical ramus osteotomy.
- (2) Treatment of congenital or acquired temporomandibular joint disease with reconstruction with the endoscopic approach.
- (3) Mandibular retrognathism can be corrected by distraction osteogenesis with endoscopic approach.

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Minimally Invasive Vertical Ramus Osteotomy:-

Careful identification and marking of the zygoma, temporomandibular joint, ramus, angle, anterior border, and condyle over the skin is done before beginning the endoscopic vertical ramus osteotomy. Incision is given 1.5cm below the lower border of mandible and dissection is done layer by layer. With the help of endoscopic elevator with suction port, bone is exposed in the subperiosteal plane. This dissection creates an optical cavity which allows excellent visualization. The endoscope runs through the dissection plane parallel to the posterior border of the ramus which provides better visualization of the ramus-condylar unit. From the sigmoid notch to the mandibular angle using a long-shaft reciprocating blade an osteotomy is done under direct visualization. The patient is placed into maxillomandibular fixation in the pre-planned occlusion and rigid fixation is done with three 12 to 14 mm long, 2.0 mm diameter screws⁵.

Minimally Invasive Bilateral Sagittal Split Osteotomy:-

After the conventional incision over the external oblique ridge and complete dissection, the anterior and posterior border of the ramus is exposed. A 30° angled endoscope allows better visualization which helps improve the corticotomy.

But this procedure requires some specialized instruments like narrow wedge osteotome, modified two wedged raspatories and buccal and lingual orthognathic retractors. After the osteotomy the mandible is fixed to the desired position with rigid fixation. The problem in this procedure is the simultaneous drilling and viewing because irrigation obscures the lens but it has the advantage of reduced invasiveness to the surrounding tissue, haemorrhage and paraesthesia⁶⁻⁷.

Navigation-Assisted Le Fort I Osteotomy:-

Virtual planning system helps in 3D manipulation of computerized tomographic data, which can further be combined with intraoperative navigation to facilitate accurate implementation of a virtual plan⁸. The virtual planning-based surgery is performed by mirror imaging of the opposite “healthy” side followed by printing of a stereolithographic model⁹. This stereolithographic model allows to perform osteotomy, construction of a custom guided stent and pre-bending of the plates. After this the entire procedure is transferred to the operative theatre to obtain the desired position of the jaws. This minimally invasive approach allows using a substantially smaller tissue incision than the classic “molar-to-molar” exposure, resulting in reduced post-operative swelling and quicker healing.

Conclusion:-

The correction of the dentofacial deformities with minimal invasive procedure may become a standard in the future. These techniques have been shown to give better result when compared with traditional operations. It is possible that, with further optimization of these techniques, some skeletal abnormalities that traditionally required major operations will be performed in the outpatient setting with only local anaesthesia and intravenous sedation. In addition to the reduction in discomfort, such a change would have a profound impact on treatment costs and access to care.

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