SMART DENTAL UPDATES

Volume 3| Issue 36|2022

Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you **"SMART DENTAL UPDATES"** which contain latest and interesting news in the field of Dentistry.

This issue contains:

- The effects of full-mouth disinfection on Helicobacter pylori recurrence
- A comparison of two alternative mandibular locations for oral appliance treatment in obstructive sleep apnea patients.
- Maxillary and mandibular development as influenced by genetics and perioral musculature
- A case report on the use of miniscrew-assisted fast palatal expansion prior to bimaxillary orthognathic surgery.

Should you need any article or information feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Limited

The effects of full-mouth disinfection on Helicobacter pylori recurrence

Introduction:

Helicobacter pylori (H. pylori) is a Gram-negative, spiral-shaped bacterium that infects almost half of the world's population. According to the most recent meta-analysis, H. pylori infects 50% of the Iranian population, primarily adults and males. This infection has been linked to gastritis, ulcers, and an increased risk of stomach cancer. [1] The control of H. pylori infection appears to be a major public health issue, as eradication is poor and reinfection rates are significant even after standardised treatment regimens. [2] Standard triple or quadruple therapies are normal first-line H. pylori treatments, although they have been shown to be less efficient in eliminating bacteria in the oral cavity and periodontal pockets. The most recent meta-analysis emphasised the importance of periodontal care in the prevention and treatment of stomach infection, but did not assess the benefit of full-mouth disinfection (FMD). FMD is launched with the goal of conducting scaling and root planning within 24 hours using chlorhexidine solutions and gels. FMD has been suggested as the first line of therapy for people with chronic periodontitis. This study looked at whether quadruple therapy, either alone or in combination with FMD, helps to minimise the recurrence of H. pylori infection.

Methods:

The 40 participants in this randomised clinical study had chronic periodontitis and H. pylori infection. Twenty of these patients received only quadruple anti-H. pylori therapy (group A), whereas the other twenty received quadruple therapy with FMD (group B). A 14C-urea breath test (UBT) after 1 and 6 months showed the presence of H. pylori. The chi-square test was used to examine the data in SPSS 16. A p0.05 value was considered statistically significant.

Results:

After 4 weeks, 15 (75%) and 18 (90%) of 20 dyspeptic patients in groups A and B, respectively, had a negative UBT. After 6 months, 8 (53.3%) of the 15 patients in group A and 18 patients in group B who had successfully eradicated H. pylori had a positive UBT. In the follow-up periods, there were no statistically significant differences between the two groups ($p>0.05$).

Discussion:

In comparison to the low prevalence of H. pylori reinfection in Western populations, and significant recurrence rates in impoverished nations. Recurrence in the first year following eradication therapy is most often due to insufficient treatment. H. pylori has been discovered in dental biofilm, where it is immune to systemic treatments. Saliva, supragingival biofilms, periodontal pockets, tonsils, and the dorsum of the tongue are among its natural habitats. Mechanical periodontal therapy has the potential to disturb the structure of the dental biofilm and improve the efficacy of quadruple therapy. [3]

A previous research found no statistically significant differences in eradication rates between triple therapy + periodontal treatment and triple therapy alone after 3 months, which is consistent with the current study's findings. The UBT test was utilised to identify bacteria in both investigations, although the follow-up duration in the current study was 6 months. [4]

Another study discovered that periodontal therapy combined with gastric H. pylori treatment decreased the recurrence of stomach H. pylori infections after 1 year, although the eradication was not significant after 4 weeks, which is similar with the current findings. They speculate that the presence of H. pylori in saliva may be a risk factor for gastrointestinal reinfection. [3]

Results of treatment with quadruple therapy alone and treatment with triple therapy plus full-mouth disinfection

Variable	Treatment		P-value
	Control	Case	
UBT after 1 month			
Positive	5(25%)	2(10%)	0.40
Negative	15(75%)	18(90%)	
UBT after 6 months			
Positive	8(53.3)	6(33.3)	0.20
Negative	7(46.7)	12(66.7)	

UBT: urease breath test

The FMD is recommended for periodontal therapy, as reported in the periodontal literature. FMD treatment include full scaling and mechanical debridement of the tooth root surfaces. Antiseptic irrigation of the gingival pockets, tongue dorsum, and tonsils is also done. The entire treatment should be carried out in a single session (or two sessions within 24 hours). Clarithromycin, as part of triple treatment, has demonstrated good gingival availability. As a result, antibiotics used to treat HP are also effective against anaerobic periodontopathogens. The periodontal FMD protocol and quadruple therapy allow for the most effective treatment of both illnesses and can substantially aid in the elimination of oral HP. [5]

Conclusion:

Implementing quadruple treatment + FMD may prevent infection recurrence, but further research is needed to validate the findings.

Implementing quadruple treatment + FMD may prevent infection recurrence, but further research is needed to validate the findings.

Reference:

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The comparison of two different mandibular positions for oral appliance therapy in patients with obstructive sleep apnea.

Introduction:

In recent years, sleep apnea has come to be recognised as a major health risk. This has proven especially true for obstructive sleep apnea (OSA), an intermittent apnea that happens during sleep and is thought to be a risk factor for disorders such as hypertension, diabetes, and cardiovascular disease. [1] During sleep, an OA can relieve upper airway blockage by moving the jaw forward. The previous study looked on the longterm usage of OAs in 48 OSA patients. Patients who kept using their OAs had better polysomnography (PSG) findings and less subjective complaints. However, hypersalivation, dry mouth, and temporomandibular joint pain and discomfort were observed as adverse effects. [2] Therapeutic mandibular postures are being employed in 50%-89% of OA therapies for OSA. The mandibular position must be close to the most protrusive position for OA therapy to be successful. However, holding this position for an extended amount of time may result in adverse effects such as toothache, stiffness, and discomfort in the temporomandibular joint. Previous research has found links between low OA adherence and both adverse effects and a lack of therapeutic efficacy. As a result, the occurrence of OAassociated side effects must be decreased in order for OA therapy to be continued in OSA patients. The purpose of this study was to examine the efficacy of OSA therapies utilising two distinct mandibular positions and to establish the best therapeutic mandibular position.

Methods:

This prospective research included 32 participants (17 men and 15 females) with mild to moderate OSA. All patients were randomly assigned to get either a 50% or a 75% mandibular advancement with an OA. The apneahypopnea index (AHI), apnea index (AI), and Epworth Sleepiness Scale (ESS) were evaluated before and after therapy. Treatment efficacy and success were compared across groups.

Results:

AI improved greatly in the group with 50% mandibular advancement, but AHI improved significantly in both groups. In either group, no substantial improvements in the ESS were seen. There was no discernible difference in treatment efficacy between groups. Females outnumbered males in terms of the proportion of patients whose therapy was successful in both categories.

Discussion:

Depending on the severity of subjective problems like as snoring and daily tiredness, an OA can be modified by the patient or the dentist. According to one study, 60% advancement was successful for 65% of the participants, and when the mandible was advanced further, the effective treatment rate jumped to 95.4%. In order to investigate the therapeutic impact of OAs with 50% or 75% advanced as the initial therapeutic mandibular position in the current study, mandibular advancement was not adjusted, and the PSG test was done 3-4 months following OA administration. It would be preferable to assess the efficacy and side effects of OA not only at two advancement positions, but also at different advancement positions; however, a larger number of patients would be necessary.

Treatment success (as measured by the AHI 10) was reported in 64.7% and 53.3% of patients in the 50% and 75% mandibular advancement groups, respectively. Treatment success was higher when characterised by AI 5: 80.0% and 76.9% in the 50% and 75% mandibular advancement groups, respectively. This shows that OA therapy for apnea was more successful than hypopnea treatment. While 50% mandibular advancement was associated with greater treatment success rates than 75% mandibular advancement, this difference was not statistically significant in individuals with mild to severe OSA. According to one study, 75% progress was effective in severe instances while 50% advancement was useful in moderate situations. These findings imply that the amount of mandibular advancement necessary for treatment effectiveness may vary depending on the severity of the OSA. [3] According to one study, OA treatment was helpful in females with OSA of any severity, with response rates much greater than in males, particularly in severe OSA. Similar to prior research, the findings imply that gender differences are determinants of successful therapy. [4]

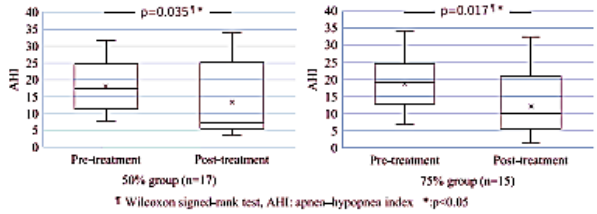

FIGURE 1 The change in AHI after treatment in the two mandibular advancement groups. Significant differences were observed between pre- and posttreatment AHI in both groups.

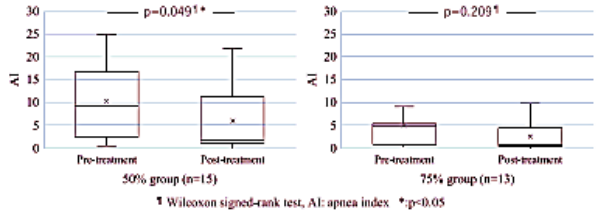

FIGURE 2 The change in AI after treatment in the two mandibular advancement groups. A significant difference was observed between pre- and posttreatment AI in the 50% mandibular advancement group.

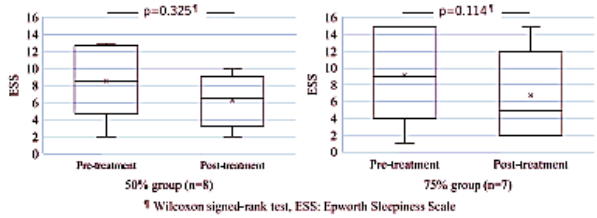

FIGURE 3 The change in ESS after treatment in the two groups. No significant differences were observed between pre- and posttreatment ESS in either group.

Only shortterm adverse effects, such as temporomandibular joint discomfort, toothache, and posterior teeth contact, were assessed in this study over a period of 3-4 months. Occlusal alterations, including decrease of overjet, have been found in various investigations with longterm OA usage. The degree of occlusion change was related to the duration of therapy rather than the kind of device. Several occlusal alterations linked with OA usage demand longterm attention and should be studied in future investigations. In addition, a selfreported questionnaire should be employed to measure OA usage compliance in each group.

Furthermore, while OSA patients were randomly assigned to one of two groups, this trial did not use a crossover design. To limit the influence of intersubject variability on therapy, randomised crossover experiments are necessary. [5]

Conclusion:

Patients with mild to severe OSA were randomly assigned to either 50% or 75% mandibular advancement OAs. The individuals were told to wear the OAs, and AHI was compared in both groups before and after therapy. AHI increased considerably in both groups, whereas AI increased significantly only in the 50% mandibular advancement group. There was no substantial improvement in ESS in any group. Furthermore, there were no significant variations in effective therapy or treatment success across groups. Females were substantially more likely than males to receive effective therapy.

According to the findings of this study, the first therapeutic mandibular position for individuals with mild to severe OSA should be 50% mandibular advancement.

The first therapeutic mandibular position for individuals with mild to severe OSA is 50% mandibular advancement. Gender disparities in therapy effectiveness have been suggested.

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Maxillary and mandibular development as influenced by genetics and perioral musculature

Introduction:

The formation and growth of the human craniofacial skeleton are complicated processes that cannot be described by a single factor. The functional matrix hypothesis has been used to investigate the impact of masticatory muscles on hard tissue, such as evaluating bite force, muscle cross-section sizes, and electromyography activity. [1] Muscle fibre types have been linked to differences in skeletal face shape. [2] Patients with higher masticatory muscle electromyography activity, for example, had a larger maxilla and a shorter lower anterior facial height than those with lower activity. Others discovered a link between perioral force and tooth location. Vertical face measures in twins revealed significant genetic control (ranging from 57% to 81% depending on the measurement), as well as a meaningful environmental contribution (18% to 42% depending on the measurement). The genetic influence on malocclusion may also be indirect, since it may contribute to variations in tooth size discrepancies. The goals of this study were to determine whether there is an association between skeletal jaw position and labial musculature function, and (2) whether genotype is associated with skeletal growth patterns in the maxilla or mandible, in order to further investigate the value of these associations and genetic variants in the prediction of postnatal craniofacial growth.

Methods:

A one-year prospective research was conducted on 42 individuals. The participants in the research were 22 girls and 20 males, with an average age of 28.5 years. Lip strength and radiography cephalometric measures were compared. Allelic and genotypic frequencies were compared to each variable for polymorphisms rs678397 and rs1815739 in ACTN3 and rs10850110 in MYO1H. To evaluate if differences were statistically significant, the Chi-square and Fisher exact tests were performed.

Results:

The data revealed significant differences between rs678397 genotype and allele frequencies and SNA angle; rs1815739 allele frequency and SNA angle; rs678397 allele frequency and ANB angle; rs678397 genotype and allele frequencies and female lip strength; and rs678397 allele frequency and overall lip strength, after mean strength values used as cut off were customised by sex.

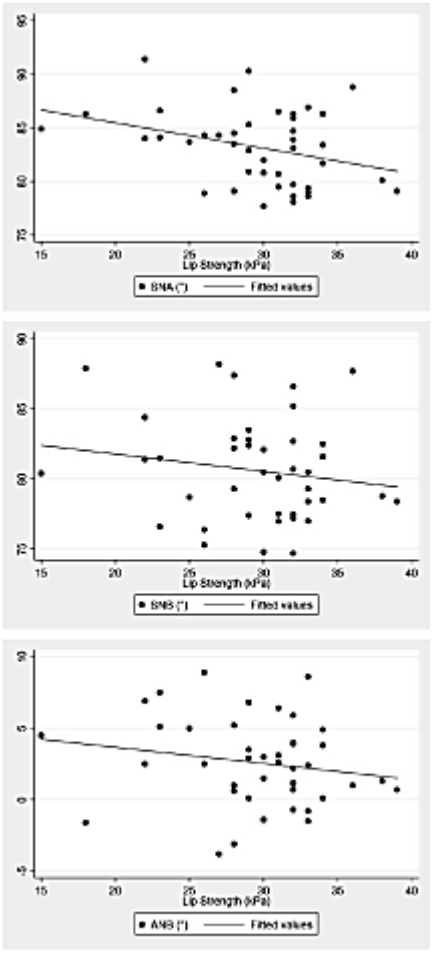

Figure 1. Summary results of regression analysis. SNA vs lip strength ($r^2 = 0.69$; $P = .03$), SNB vs lip strength ($P = .3$), and ANB vs lip strength ($P = .25$).

Discussion:

The outcomes of this study corroborated prior studies on certain SNPs and their relationships with jaw development. 11,12,20 The ACTN3 polymorphisms rs678397 and rs1815739 were related with bigger SNA and ANB angles in the current study, and rs678397 was virtually substantially associated with a Class II skeletal phenotype. The MYO1H SNP at

rs10850110 was related with a Class III skeletal phenotype but not with a protruding mandible. The current data for the maxilla support the concept that jaw position is related to lip strength. Weak lips were shown to be substantially related to a greater SNA angle or a more protruding maxilla. Furthermore, in females, weak lips were related with an excess of the C allele in rs678397 and rs1815739. Although lip strength was not shown to be substantially related to SNB angle, there was a trend toward a negative relationship.

The findings revealed that having more C alleles for markers in the gene ACTN3 may be associated with thinner lips, as well as more protruding maxillae, bigger jaw discrepancies, and a Class II skeletal connection.

A marker in the gene MYO1H was shown to be linked to a Class III skeletal connection. As a result, it is probable that genotype and soft tissue influence jaw skeletal growth.

The individuals in the research were divided into three groups based on their skeletal malocclusion. Skeletal malocclusion was examined in the current investigation, and patients were divided into high and low SNA, SNB, and ANB measures. The patients in the research were orthognathic Class II and Class III instances. The patients were all of European ancestry. Because the need for orthognathic surgery was not investigated in this study, there was most likely a mix of orthognathic and nonorthognathic instances, and patient ethnicity was not consistent. Furthermore, the entire sample was made up of patients who came to the University of Pittsburgh for therapy. Allele frequencies may differ between populations in Pittsburgh, Pennsylvania, and those in France.

The links revealed in this study between genotype, lip strength, and skeletal development backed up Moss' theories in the functional matrix theory. Moss recognised that hereditary factors influenced skeletal growth, but he also believed that growth was connected to the underlying muscle matrix. The orbicularis oris may contribute to the posture of the maxilla through sustained forces of facial expression and speaking. A stronger orbicularis oris may put pressure on the maxilla, inhibiting forward development, whereas a weaker perioral musculature may enable the maxilla to expand forward with less resistance. It is also possible that the maxilla modulates lip strength, with a more protrusive maxilla resulting in weaker labial musculature.

Knowing if a patient is genetically susceptible to skeletal differences in jaw position may lead to better diagnosis and treatment planning in the future. Patients with retrusive maxilla genotypes may benefit from the use of myofunctional gadgets to resist lip pressure. Patients who are at risk of having a protruding maxilla may be able to lower their risk by performing lip strength exercises. The IOPI equipment used in this study to evaluate lip strength may be utilised for exercise treatment and has been shown to enhance orofacial muscle strength in dysphagia patients. If jaw position can be anticipated, the danger of adverse growth is lowered, reducing the number of patients who require retreatment.

Conclusion:

Soft tissue assessment and phenotypic description may open up new avenues for detecting genetic connections. The ACTN3 polymorphisms rs678397 and rs1815739 were linked to greater SNA and ANB angles. Females had a stronger link between lip strength and maxillary position.

ACTN3 polymorphisms are linked to weak lips and greater SNA and ANB angles.

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A case report on the use of miniscrew-assisted fast palatal expansion prior to bimaxillary orthognathic surgery.

Introduction:

Class III malocclusions have historically been one of the most difficult skeletal and dentofacial defects to address in orthodontics, necessitating a detailed evaluation and treatment strategy. When a patient's mandible and maxilla are significantly different, Orthognathic surgery is the most commonly used procedure to correct dentofacial anomalies in patients who are no longer growing or where orthodontic camouflage is ineffective. In addition, some class III patients have maxillary hypoplasia and mandibular hyperplasia with a low tongue posture, resulting in a completely transverse discrepancy. In juvenile and adult patients, mini-screw aided rapid palatal expansion (MARPE) is an effective technique for addressing a maxillary transverse deficit. MARPE not only causes maxillary bone growth, but also a disjunction of the circum-imaxillary sutures and the surrounding craniofacial tissues, including nasal and zygomatic bone. The most effective treatment for severe skeletal malocclusions has been defined as a combination of orthodontic treatments and orthognathic surgery to restore maxillo-mandibular relationship and facial attractiveness. [1]

Case Report:

A 25-year-old female patient complained about her appearance and arrived with anterior crossbite with laterognathia. 5 years ago, the patient was undergoing orthodontic treatment for a crossbite. A Class III skeletal association with hyperdivergent development was shown by cephalometric examination. The patient had an anterior and posterior crossbite extending from the upper left lateral incisor to the first molar on the left side. She had a class III right and class I left canine, a class III molar relationship on the right and a class I molar on the left, and the upper and lower midlines were displaced 2mm to the right and 3mm to the left, respectively, relative to the face midline.

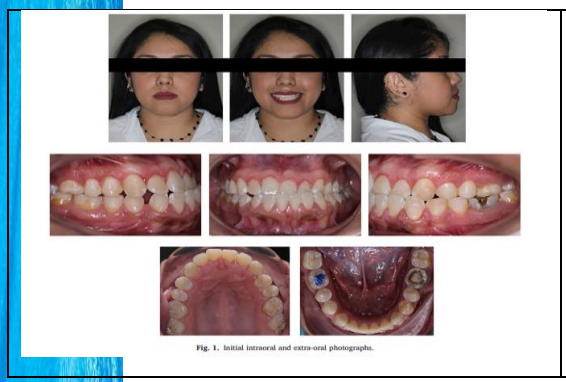


Fig. 1. Initial intraoral and extra-oral photographs.

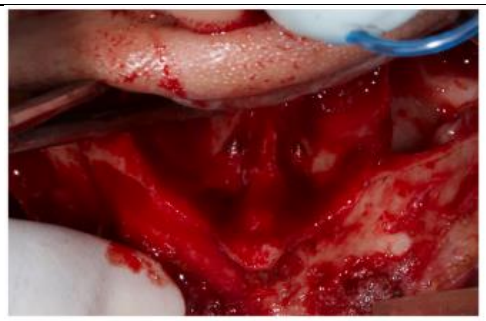
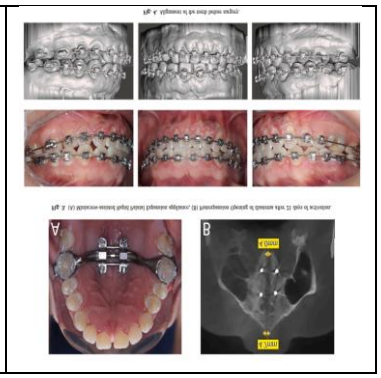


Fig. 2. Bicortical miniscrews.



A skeletal maxillary expander device with screws (SMES, BioRAY) was used to execute this treatment, which included an 11 mm expander screw and four self-drilling mini-screws (1.8 mm in diameter and 10 mm in length). Under local anaesthetic, all mini-screws were positioned parallel to each other. A 10 mm miniscrew was employed to achieve bicortical retention on the palate (Fig. 2). The device was welded to the ss bands, then it was cemented to the first upper molars using glass ionomer (Fig. 3). SMEs were engaged by five spins every day for two weeks, according to Moon's technique. Only two turns were granted every day once the diastema opened (0.25 mm per turn).

The activation ended when the maxillary width exceeded the mandibular width (by 5 mm). To sustain retention, SMEs stayed inactive for 10 months. After 10 months (1 month of expansion alone and 9 months of orthodontic therapy), the tooth alignment was satisfactory (Fig. 4). Under general anaesthesia, the surgery included a 1-piece Lefort to correct maxillary canting and a BSSO to treat laterognathia, with osteotomies secured with mini-plates and screws (Fig. 5). The therapy was completed after 18 months. The transverse maxillary constriction was rectified, and the unilateral cross-bite was resolved with a 6 mm increase in breadth (Table 2). A comparison of CBCT images before and after therapy indicates the maxillary expansion obtained (Fig. 6). Following treatment, the patient has Class I molar and canine left and right connections (Fig. 7).
After treatment, cephalometric results reveal a rise in the SNA, a drop in the SNB, and a decrease in the WITS index (11.5). Table 1 also demonstrates a counterclockwise rotation of the jaw and a modest rise in the vertical position of the maxilla. Upper and lower incisors were retruded. All dental and skeletal objectives were met, and the face outcome was visible.

Discussion:

Patients with skeletal Class III malocclusion had greater buccal inclinations of the upper posterior teeth and lingual inclinations of the second molars in the mandibule; however, nonsurgical palatal expansion in adult patients has been demonstrated using mini-screw-assisted rapid palatal expansion [2]. Prior to surgery, the primary goals of orthodontic therapy are to decompensate the teeth in the sagittal, vertical, and transverse planes.
It has been demonstrated that 50% of relapses in the first year after surgery in transverse movements in a single stage correspond directly to bone tissue loss, whereas 60% in two stages correspond to the dental position, which can be managed by overcorrecting during the first stage (assisted maxillary expansion) prior to orthognathic surgery, resulting in greater long-term stability.
A study evaluated the stability of bimaxillary surgery performed with or without presurgical rapid palatal expansion assisted with miniscrews in adult patients. They resolved the maxillary transverse collapse and corrected the posterior unilateral cross-bite with a nonsurgical orthopaedic expansion with MARPE before bimaxillary surgery, and they further (1) minimised the unfavourable effects such as vestibular inclination of the teeth and thinning of the buccal bone plate. [3]
The transverse extension of the maxilla in a single stage induces stretching of the palatine mucosa, and the strain imparts a constriction force to the operated maxilla, limiting its expansion and training it for relapse.
A first step of aided maxillary expansion has been indicated for maxillo-mandibular discrepancies bigger than 6 or 7 mm to develop more bone tissue as well as more tissue in the palatine mucosa. It has been demonstrated that 50% of relapses in the first year after surgery in transverse movements in a single stage correspond directly to bone tissue loss, whereas 60% in two stages correspond to the dental position, which can be managed by overcorrecting during the first stage (assisted maxillary expansion) prior to orthognathic surgery, resulting in greater long-term stability. Clinicians have historically struggled with the diagnosis, prognosis, and management of skeletal class III malocclusion. The most common cause of unfavourable results or post-surgical complications in patients undergoing orthognathic surgery is inadequate and

inappropriate presurgical treatment planning. As a result, the diagnosis, orthodontic surgical objectives, and treatment plan must be discussed and accepted by both the orthodontist and the surgeon before treatment begins.

Conclusion:

To correct the transverse maxillary discrepancy and posterior cross-bite in adult patients, mini-screw-assisted Rapid Palatal Expansion can be used before bimaxillary orthognathic surgery; however, several factors must be considered, including the severity of the deficiency, age, and the condition of the premaxillary sutures.

Class III malocclusions have been one of the most difficult skeletal and dentofacial anomalies to correct in orthodontics; some class III patients have maxillary hypoplasia, resulting in a transverse discrepancy; the gold standard for treating patients with severe class III skeletal malocclusions is orthodontic therapy and orthognathic surgery; currently, Mini-screw assisted rapid palatal expansion with (MARPE) is an efficient procedure for correcting. A 25-year-old class III skeletal female patient with hyperdivergent growth anterior and posterior crossbite and laterognathia was treated. To correct the patient's transverse deficiency, presurgical miniscrew assisted rapid palatal expansion was chosen, and bimaxillary surgery was performed to treat the mandibular hyperplasia and facial asymmetry. The procedure included a one-piece Lefort to address maxillary canting and a BSSO to correct laterognathia. The treatment was completed in 18 months, with CBCT pictures revealing maxillary extension, all dental and skeletal goals met, and the facial outcome visible. In adult patients, MARPE can be used before bimaxillary orthognathic surgery to address transverse maxillary discrepancy and posterior cross-bite; however, several parameters such as the severity of the deficit, age, and the condition of the perimaxillary sutures must be considered.

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