# Retrospective Evaluation of Sliding Advancement Genioplasty Cases

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# CERTIFICATE

This is to certify that this dissertation titled " **RETROSPECTIVE EVALUATION OF SLIDING ADVANCEMENT GENIOPLASTY CASES "** is a bonafide work done under my guidance by **DR. VINAY KUMAR REDDY. G** during his postgraduate study period between 2002-2005.

This dissertation is submitted in partial fulfillment for the award of the degree of Master of Dental Surgery in Branch I- Oral and Maxillofacial Surgery of The Tamil Nadu Dr. M.G.R. Medical University.

It has not been submitted (partially or fully) for the award of any other degree or diploma.

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# INTRODUCTION

Genioplasty means a plastic procedure on the chin that involves both bony component i.e., anterior portion of the base of the mandible and the soft tissue component. The procedure can be performed either alone or as an adjunctive to other orthognathic & facial plastic procedures to achieve; acceptable facial esthetics by means of; balance, form, symmetry and functional outcome like; balance of the muscular activity around the oral commissure.[1,2,51]

Genioplasty can be performed as; direct osteoplasty (sliding dvancement, sliding set back, double sliding advancement, centering, jumping, vertical reduction, cranially convex osteotomy, with interpositional graft, tenon method, vertical strip excision, enlargement or reduction of width of the lower border), soft tissue correction or implantation of an alloplastic material / cartilage / bone.[25, 50]

Direct osteoplasty with good fixation methods is mostly preferred because of its versatility, lower infection rate, less resorption of the graft and more stable results. Sliding advancement osteoplasty of the genium is frequently performed procedure in Oral & Maxillofacial surgery.[44,51]

Both horizontal and vertical movements occur with advancement genioplasty. The movement of the distal chin segment along the osteotomy can be divided into a major horizontal component and a minor vertical one. Literature states that, a mean 2mm reduction of mandibular height to the width of the surgical bur used for the osteotomy. It is found that the ratio of horizontal to vertical change is 1 : 0.47. [1,2,8,27,44]

In this retrospective study, evaluation of 11 patients who have undergone direct osteoplasty of the genium either alone or along with other orthognathic surgical procedures is used to analyze the vertical movement of the genium when pure advancement genioplasty is performed.

Apart from this unfavourable vertical movement, other complications uch as, unfavourable osteotomy at the posteroinferior border, paresthesia over the mental nerve region, haematoma, infection from the plate are also encountered.

## REVIEW OF LITERATURE

**John L. Shannon (1972)** in his study he conscisely describes the mentalis muscle anatomically as it relates to edentulous mandible. Fifty mentalis muscles were examined on 25 adult human cadavers with

edentulous mandibles, and emphasized that the medial fibres of the mentalis muscle crossed the midline to join the mentalis muscle of the opposite side, the most superficial fibers of the mentalis muscle coursed upward to join the orbicularis oris.

**Stephen W. robinson et al (1972)** performed a lateral cephalometric profile analysis of ten patients with mandibular prognathism, which was treted by a combined orthodontic surgical approach. The changes in the soft tissue profile were evaluated using tracings of lateral cephalometric radiographs.

**William H. Bell et al (1973)** defined as a surgical procedure, performed either intra or extraorally to correct deformities of the chin. Anterior sliding genioplasty is a surgical procedure, performed intra-orally, to augment the contour and / or reduce the height of the mandibular symphysis. Anterior sliding genioplasty was done in eight patients. The relationships of the soft tissue changes in the chin after genioplasty was examined. The criteria applied included a minimum follow-up of 6 post-operative months. The eight anterior sliding genioplasties in this study were pedicled to lingual tissues and demonstrated no relapse or resorption. Significant resorption of the non-pedicled genioplasties has been observed. Analysis of soft tissue changes associated with genioplasty in this study

reveals a highly significant correlation of bone changes and soft tissue changes. The anteroposterior changes in profile can be predicted from the data obtained. A figure of 0.6 as a ratio of soft to hard tissue chin movement for clinical prediction.

**Timothy A. Turvey et al (1974)** in a scientific article presented by them advocate some soft tissue procedure in improve the facial balance in patients undergoing oral surgical orthodontic correction at dento-facial deformities. The following changes were noted; improvement of chin-neck line, change in the soft tissue chin, reduction of mentolabial fold.

**Emit W. Steinhauser et al (1974)** did a preliminary study of soft tissue changes following surgical orthognathic procedures. Forty-one cases were analyzed before treatment and atleast three months after surgery. They found that soft tissue chin followed the hard tissue chin nearly 1:1 ratio.

**Paul. A. Lines et al (1974)** underwent a preliminary study for soft tissue changes following advancement genioplasty. Measurements were made between constructed hard tissue and soft tissue points located on each before and after film tracing. Comparison were made and ratios of soft hard tissue changes were formulated. In cases where advancement genioplasty was done to increase the vertical dimension of the lower third of the face, the ratio of the soft tissue chin to the hard tissue chin is 1:1.

**James. P. McDonnell et al (1977)** [22] retrospectively studies 15 patients who had received advancement genioplasty in conjunction with other maxillofacial surgery by cephalometric analysis. Horizontal changes in the osseous and soft tissue chin noted from preoperative, immediate post-operative (mean of eight days), and a year or more post-operative (mean of 20months). Prediction equations based on mean ratios and linear regressions were developed and tested by a comparison of the residuals between the predicted and observed changes in the soft tissue chin. For purpose of prediction in treatment planning, a ratio of 4:3 is recommended for the surgical horizontal advancement of the symphysis versus the net horizontal change in the soft tissue chin point.

**Lawson W, Binder W. (1978)** [21] Profile correction of cosmetically deforming micrognathia in patients with functional occlusion may be attained by the foreshifting of multple horizontal oblique osteotomy segments of the anterior mandible. We discuss the development, limitations, advantages, preoperative evaluation, and surgical technique of this method.

**Goracy ES.(1978)** [17] A fracture of the body and ramus of the mandible occurred during a horizontal esteotomy for augmentation

genioplasty. Care must be exercised when using osteotomes to free the posteroinferior border during this procedure.

**Bruce N. Epker et al (1980)** [49] explained a surgical approach for the correction of the facial imbalance that exists in patients with the short face syndrome. The surgical technique they explained is an interpositional genioplasty where they preserved the origin of the mentalis muscle. They concluded that to superiorly reposition the lower lip to promote a high mentalis attachment the suturing and pressure dressing has to be applied, failure of which may lead to an unsupported lower lip and poor esthetic results.

**Harry. L. Legan et al (1980)** did cephalometric studies and measured jaw discrepancy to other anterior facial structures, comparing how for forward or backward the chin is positioned relative to nasion or glabella. He explained that in patients with chin positioned backward in relation to the nasion, advancement genioplasty have been advised. Advancement genioplasty not only improves the prominence of the bony chin but also deepen the sulcus.

**William H. Bell et al (1981)** [5] done a retrospective study of the osseous and soft tissue change and clinical results after reduction

genioplasty for correction of anteroposterior macrogenia in adults. Chin ptosis manifest as double chin may occur as a consequence.

**G.B. Scheideman et al (1981)** [35] analyzed retrospectively the soft tissue changes associated with concomitant advancement genioplasty. To increase the amount and predictability of soft tissue changes associated with advancement genioplasty, the surgical technique has been modified to maximize the attachment of the soft tissue to the anterior and inferior aspect of the distal segment. The results indicated that a nearly 1:1 ratio of soft tissue change to hard tissue change could be expected in patient's treatment in the manner described.

**Carlos Javier Busquets et al (1981)** [6] discuss the effects of bony genioplastic advancement on soft tissue of the profile by means of lateral cephalometry. Vertical and horizontal changes of hard and soft tissue of the lower portion of the profile were measured. A conclusion matrix was used to determine the relationship between skeletal and integumental changes after surgery.

**Vikan sassouni et al (1981)** conducted a cephalometric study of changes in the soft tissue profile after horizontal osteotomy for genioplasty in 14 subjects. They found an anterior change at the hard tissue landmark, pogonion was accompanied by an anterior movement of soft tissue

landmarks of the lower 1/3rd of face. They concluded that 1mm of change at pogonion resulted approximately 0.8mm anterior change at the point C the overlying soft tissue landmark. The response of the soft tissue of the lower lip showed, for 1mm change at pogonion resulted approximately 0.4mm anterior displacement at Li, the overlying soft tissue landmark.

**Dmytryshyn.R (1982)** states that for the cosmetic facial surgeon, the consideration of the chin area is important when developing an esthetically balanced face. Emphasis is placed on the evaluation of the patients and the surgical technique of advancement genioplasty. The goal is mentoplasty is to create facial harmony.

**W.H. Bell et al (1983)** [4] the biologic and clinical foundation for using a broad soft tissue pedicle advancement genioplasty technique was described. This technique is versatile and stable and produces more predictable soft tissue changes than previously reported methods of altering chin contour with alloplastic implants.

**David C. Quast et al (1983)** conducted a long-term cephalometric analysis of eighteen patients who had undergone mandibular advancement surgery. The analysis was done to provide an improved database for predicting the soft tissue changes that accompany mandibular advancement surgery. The interpretation of the mean value, ratio and regression equation

data showed that the chin tissues moved forward and downward. The mandibular short term horizontal change mean were greater than the long-term horizontal change mean.

**Edward Ellis et al (1984)**[10] conducted a study on 12 adult Rhesus monkeys on which advancement genioplasty was done. The insertion of digastric musculture and lingual soft tissues on the surgical segment was maintained in six and in the other six had all soft tissues stripped. Cephalometric analysis of the anterior part of the mandible was done. The result showed that resorption of the most anterior portion of the genial segment was less in the firs group than in the second group. The first group showed only 0.12mm relapse where as the second group showed 0.50mm.

**Dale M. Gallagher et al (1984)** [15] did a study on the osseous and soft tissue changes of the chin of ten patients treated formaxillary excess by Lefort I osteotomy and advancement genioplasty was undertaken in their retrospective study. The results showd an increase in the submental length, lower facial-submental angles and lower facial tangents. Improved relationship between lowerlip-to-tooth pos-operative relation. And according to him soft tissue changes following horizontal osteotomy at the inferior border of the mandible depend upon direction of the positional change of the chin segment, the design of the mucosal and osseous incisions and on other

concomitant jaw movements. Incorrect planning, vestibular scaring, excessive detachment of the soft tissue from the chin, myotomy, improper closure of the soft tissue incisions, hematoma formation, genial remodeling and excessive bone resorption may compromise the results of the surgery.

**Derek Henderson (1985)** explained advancement genioplasty combined with mandibular advancement. All the cases were performed without detaching the soft tissue pedicle with a division of the anterior bellies of the digastric about 1cm from their detachment to the back of the segment. The results seem to be stable after the procedure. The ratio of the osseous to the soft tissue changes is 1:1 after advancement genioplasty.

**David S. Precisous et al (1985)** [31]specified to the point of preserving as much as possible the insertions of the labiomental muscles during the subperiosteal dissection of the antero-inferior border of the mandible. These muscles include the mentalis, depressor anguli oris, depressor labii inferioris and part of the orbicularis oris. This will prevent the ptosis of the chin and give good aesthetic results.

**Schendel SA. (1985)[36]** Genioplasty results in aesthetic and functional changes to the chin and perioral areas. A physiological approach combines osseous and soft tissue reconstruction to produce a superior result that is especially important in individuals with bilabial incompetence. In this

review, facial muscle hyperfunction and vertical maxillomandibular excess are identified and their treatment outlined. The modified Michelet genioplasty, an ideal technique for vertical chin reduction and/or advancement, is described.

**Epker & Fish (1986)** [11]explained that the cephalometric tracing of the soft tissues in the vertical parameters from the subnasale to, mucocutaneous junction of the lower lip and from that point to soft tissue menton should be in the ratio of 1:0.9. He further emphasized that during advancement genioplasty the inferior chin segment should not be degloved, so that the skeletal movement of the bone carry the soft tissue with it in a 1:1 ratio and optimizes the predicted result.

**Rosen HM. (1988)** [32] Surgical correction of the vertically deficient chin has received relatively little attention. This paucity of information is most likely related to the failure to diagnose vertical microgenia and the questionable stability of its surgical correction utilizing autogenous bone grafts. This paper reports on eight patients who have undergone vertical augmentation genioplasty utilizing a transverse symphyseal osteotomy and interpositional implantation of porous, block hydroxyapatite.

**W.H. Davis et al (1988)**[8] twenty three patients who had undergone advancement genioplasty were evaluated an average of over 3years post surgically for bone and soft tissue stability. Traced serial cephalometric radiographs revealed no discernible bone remodeling from gnathion to menton region. Six cases showed minor poterior shifting of the inferior border segment. Although good correlation existed between hard and soft tissue movement, minor soft tissue variation occurred without obviouscorrelation to bony remodeling.

**Storum KA, Bell WH, Nagura H. (1988)**[40] Correlated microangiographic and histologic studies in adult rhesus monkeys indicate that a pedicled genioplasty involving osteotomy of the inferior mandibular border maintains circulation and osseous viability of the repositioned genial segment. Circulation to the dental pulps was also not discernibly affected when accomplished a minimum of 8 mm below the root apices.

**Wolfe & Berkowitz (1989)**[51] according to them sliding advancement genioplasty is a procedure in which the lower fragment is directed forward, similar to a drawer being opened, until its posterior cortex is in contact with the anterior cortex of the remainder of the symphysis. If a minor alteration of the vertical dimension of the chin is desired in addition to chin advancement, the inclination of the osteotomy can be varied slightly.

Angling it superiorly gives not only a longer, mobile inferior fragment but also a stable incline favourable to vertically lengthen the chin. Angling it inferiorly achieves the vice versa.

**Hyung Sik Park et al (1989)[27]** studied the immediate and post surgical changes in the hard and soft tisues of the chin after advancement genioplasty by means of oblique osteotomy of the mandibular symphysis. Twenty three patients who had undergone this procedure were evaluated. Cephalometrically for upto 6 months after surgery. In all the cases the broad soft tissue pedicle (maximized attchment of the suprahyoid muscles and periosteum to distal segment) were maintained. During the postoperative period of 6months in this study, change in the sagittal position of the hard tissue pogonion was minimal (less than 0.5mm) but its vertical position showed a remarkable change during 3 and 6 months post-operatively with a tendency for inferior repositioning. However, over all soft tissue position was stable during the same period.

**Scott L. Spear et al (1989)[38]** in his article discussed the patient evaluation techniques and complications involved in genioplasty. He further discusses the complications, which includes the infection, hematoma and rarely mental nerve injury. When the advancement osteotomy fails to leave a soft tissue pedicle on the bony segment, there is an increased incidence of

infection and even avascular bone necrosis. Bone resorption is also well known. Complications if not a side effect longterm loss of 2 to 4mm (20 to 40%) of projection occurs in most patients depending on the degree of initial advancement.

**Hookey SR, Goodday RH. (1989)**[19] Since the orthodontist is frequently the first clinician to be consulted for dentofacial deformity, an awareness of potential surgical procedures available to correct such deformities is imperative. Despite the fact that isolated genioplasty is becoming rare, the role the procedure plays in corrective jaw surgery is not diminished. Functional and cosmetic aspects must be considered in case planning and the flexibility of the procedure lends itself well to deformity correction in all three dimensions.

**Wittbjer J, Rune B. (1989)** [50] Surgical advancement of the chin, and postoperative relapse, were studied during a three-year period in 17 patients. Changes were measured on lateral cephalograms obtained at certain intervals. Sagittal skeletal changes were recorded parallel to the Frankfort Horizontal plane. Soft tissue changes were recorded by advancement of soft tissue Pogonion along a line parallel to the mandibular base line and by the increase of the angle NFL/NCL. The average skeletal advancement was 8 mm with a relapse of 1 mm two months after surgery. No further changes

were registered during a three-year observation period. The average soft tissue advancement was 7.5 mm from two months after surgery and no relapse was found after this time. The soft to hard tissue ratio of the changes was 0.94 which corresponds to results reported in the literature. There was no correlation between the average amount of advancement and the amount of relapse. The range of changes showed a wide variation, however.

**Segner. D et al (1991)** studied 21 patients who underwent advancement genioplasty in conjugation with other orthognathic surgery and analyzed the stability of the genioplasty and its effect on the soft tissue pedicle. The average of sagittal soft tissue change in relation to the correction of the bony chin was 71%. The individual values ranged from 4% to 45% and the standard error of the estimate was 3mm. Therefore, the planning of the soft tissue profile is rather unreliable.

**Vedtofte. P et al (1991)** [46,47]compares the influence of the soft tissue attachment in advancement genioplasty in two groups of the patient. One group of patients who underwent advancement genioplasty with complete detachment of the soft tissue from the genial segment. In the other group of patients, the lingual soft tissue was maintained.

**Rosen HM. (1991)**[33] Class II skeletal patterns are frequently associated with abnormalities of lower face height, which, in turn, affect labiomental fold morphology. Of 68 patients who were to undergo sagittal advancement of their chins, 88 percent were considered to have abnormal labiomental fold morphology that was closely related to abnormalities of the facial height. Patients with decreased lower face height (40 percent) had exaggerated, deepened folds with acutely closed angles between the lower lip and chin pad, whereas those with increased lower face height (25 percent) had shallow, effaced folds. Patients with normal lower face height had variable fold morphology. Isolated sagittal advancement and/or simultaneous advancement and vertical shortening deepened the labiomental fold and closed the angle between the chin pad and lower lip. Simultaneous advancement and lengthening tended to deemphasize the fold, making it appear less deep in 20 of 34 patients, or at least mitigated further accentuation of the fold in 14 of 34 patients. Altered labiomental morphology and its relationship to the class II skeletal deformity is discussed. Treatment planning decisions are suggested, taking into account labiomental aesthetics and how they are influenced by advancement genioplasty.

**W.D. Polido et al (1991)** [29] performed large advancement genioplasty in 16patients, with the preservation of a musculoperiosteal pedicle to the advanced genial segment. Afte a mean followup period of 15months. 76% of the initial advancement was preserved, representing 24% osseous resorption.

**Mark Ewing et al (1992)**[12] explained that advancement genioplasty caused profound change in the vertical relationship of hard and soft tissue structures. Before surgery the soft tissue pogonion was positioned superior to the skeletal pogonion, especially in the genioplasty cases. After surgery, the soft tissue pogonion in the genioplasty cases. After surgery, the soft tissue pogonion in the genioplasty cases had moved inferiorly producing a definite chin point. The marked vertical change was partly due to the genioplasty procedure.

**Kremanov. L et al (1992)**[20] performed sliding genioplsty by two ways; one by stripping the periosteum from the anterior – inferior surface of the segment which resulted in thinning of the soft tissues. The other way by maintaining as much soft tissue attachment as possible to the repositioned segment. Minimal reflection of the soft tissue from the segment, only enough to allow the visualization and access to the level of the osteotomy. This gives more predictable changes in the soft tissue chin. Their results suggested that a ratio of 1.0 and 0.9 could be used to predict the soft tissue to osseous movement when advancement genioplasty was performed.

**C.F. Defretais et al (1992)** [9]in his study evaluateds skeletal stability and the remodeling process of the advanced genial segment, in which the single bone plate is used to stabilize the segment following osteotomy of the inferior border of the mandible. This results showed that stability of the results are excellent.

**William H. Bell (1992)** According to him the soft tissue changes following horizontal advancement genioplasty depend upon the magnitude and direction of the positional change of the genial segment, that design the mucosal and osseous incisions, the amount of soft tissue stripping and other concomitant jaw movements. The advantages of osseous genial surgery are preservation of the normal skin contour, improved predictability of the soft tissue response, stability, versatility and preservation of blood supply to the osteotomized regions.

**Ayoub A. F et al (1993)**[1] in his study examined skeletal stability following advanced pedicled genioplasty. The stability of the advanced segment was excellent after 6 months. At 6 months remodeling was observed in the form of bone apposition at B point and pogonion point with bone resorption at the superior aspect of the genial segment.

**Epker B.N. (1994)** [10] emphasized the preoperative cephalometric prediction tracing, planning before advancement genioplasties which

indicated that the patient would benefirt from the chin advanement that exceeds the thickness of the mandibular symphysis in the region of the planned osteotomy. He also emphasized that when the chin segment is advanced and telescoped over the stable mandibular segment using the screws to prevent is inadvertent superior displacement, which could result in the compression neuropathy of the mental neurovascular bundles.

**Omnell ML, Tong DC, Thomas T. (1994)**[25] Bimaxillary osteotomies and a sliding genioplasty were performed to correct mandibular micrognathia and maxillary vertical hyperplasia in a 19-year-old white male with a Class II, division 1 malocclusion and anterior open bite. At a follow-up appointment with the orthodontist 4 weeks after the surgical procedure, the mandibular anterior teeth showed severe gingival recession, exposing labial root surfaces on the mandibular central incisors. Grafting procedures were able to restore labial soft tissue on the affected teeth. It is suggested that wound healing contraction of gingival tissue in the area of the incision for the genioplasty caused this complication.

**Van Sickels JE, Smith CV, Tiner BD, Jones DL. (1994)**[44] Variability in soft tissue response to genial advancements has been noted in the literature. Although many factors may influence the results, little attention has been paid to bony vertical movement in conjunction with the

bony horizontal movement of the chin and its effect on horizontal soft tissue movement. Eighteen patients who underwent isolated genial advancements were studied preoperatively and for at least 6 months after surgery. It was noted that the further the chin was advanced the less the soft tissue followed the advancement. In addition, vertical movement of the chin greatly influenced the overall result. The more the bony chin is shortened, the thicker the soft tissue chin becomes; the reverse is true when it is lengthened. Finally, horizontal resorption/stability appears to be influenced by the amount of dissection rather than the amount of advancement.

**Hellman. G et al (1995)** by advancement genioplasty sagittal repositioning of the chin can be used to improve function and aesthetics. The most commonly employed technique involves a viability of the lower border of the mandible, thus allowing a sliding advancement.

**Rosen H.M (1995)** [34]in this study of advancement genioplasty to avoid unaesthetic results the chin should not be advanced beyond the lower lip, the only component over which osseous genioplsty has no content. The extent of sagittal chin movement was planned to advane the soft tissue pogonion further than the lower lip.

**Kasey K et al (1996)** advocated a sliding genioplasty to help remedy failed chin implant. This report presents the immediate sliding genioplasty for infected or extruded chin implants and discussed the surgical technique and rationale.

**Ousterhout DK. (1996)** [26] Mental nerve injuries have been inculcated in sliding genioplasty. The anatomical finding was that in none of the mandibles studied did the inferior alveolar nerve canal dip more than 5.5 mm below the inferior border of the mental nerve canal. There were three permanent injuries (one bilateral complete numbness, one unilateral complete numbness, and one unilateral partial numbness). It seems advisable to always keep 6 mm as a minimal distance because avoiding a nerve injury should be an obligatory goal of this surgery. If a greater distance can be kept without decreasing the aesthetic result, it should be considered.

**Gnyuron B et al (1997)** [18] according to him sliding genioplasty harbor the potential for outcomes that may mandate a revision. A successful reversal of this often enigmatic situation requires a thorough analysis of the clinical condition, as well as the emotional motive leading the patient to seek a revision surgery.

**Fridrich KL, Casko JS. (1997)** [14] The influence of anterior mandibular height is often overlooked when planning treatment of facial vertical excess or deficiency. Although treatment decisions tend to focus primarily on Le Fort I maxillary osteotomies, genioplasty remains a useful adjunctive surgical procedure. Components of anterior facial vertical dysplasia are reviewed, and six genioplasty strategies are described.

**Yitzhak Shoshant et al (1998)** [37] the purpose of his study was to develop a prediction method for advancement genioplasty that would result in accurate pre-operative cephalometric planning of the osteotomy slope in accurate pre-operative cephalometric planning of the osteotomy slope and that could be transferred to the patient during the surgical procedure.

**Celik. M et al (1999)** proposed a new technique of advanement genioplasty “splitting advancement genioplasty” This technique has been developed to avoid same undesired results of the current concepts of genioplasty techniques and to ahieve a smore natural appearance in the advanement genioplasty.

**Robert A. Strauss et al (2000)** in his study he found out the osteoplastic procedures produces a higher ratio of soft tissue change to the osseous change and more stable results thereafter. Such success are not liable using alloplastic implants.

**Fonsecka R.J. (2000)** [13] he stressed on the fact that both vertical and horizontal changes be influenced by the angle of the osteotomy. He stated the osteotomy cuts should be parallel to the occlusal and mandibular plane more pure the advancement in anteoposterior axis.

**Troulis MJ, Kearns GJ, Perrott DH, Kaban LB. (2000)** [43] The purpose of this study was to describe an extended genioplasty technique and to evaluate stability of position, form, surface area of the chin and incidence of postoperative sensory deficit. Records of 15 consecutive adult patients who underwent the extended genioplasty procedure were reviewed. The technique included incision in the labial vestibule from 2nd premolar to 2nd premolar, dissection, mobilization and retraction of the mental nerves, osteotomy parallel to the occlusal plane extending proximally to the antegonial notch and rigid fixation. Lateral cephalograms pre- and postoperatively and at the latest follow-up (> 6 months) were analyzed by linear and computer morphometric measurements to evaluate changes in position, shape and surface area of the chin. Inferior border form was rated as smooth in all cases.

**Chaug E. W et al (2001)** used sliding genioplasty for correction of chin under projection which has a significant effect on facial symmetry. It can be used in chin asymmetry, prognathias and vertical height

discrepancies. The objective of the study to illustrate the versatility and ease of this procedure and to confirm the excellent clinical results obtained with minimal complications.

**Nojan Talebzadeh et al (2001)** [42] according to him advanement genioplasty as so important and reliable technique for the esthetic results of the lower facial skeleton. His study indicates that there is no significant relapse after advanement genioplasty ie., afte 12 months post-operative period when internal rigid fixation was used.

**Veltkamp et al (2002)** [48] the purpoe of the study were to examine the multidimentional change of the soft tissue chin after mandibular advancement and advancement genioplasties and design a predictive models. The mandibular incisions and pogonion were advanced surgically approximately 6mm and 11mm respectively. The lower lip lengthened slightly and it surface contour straightened because of thinning at labrale inferior , there was slight thickening at the labiomental fold and a slight thinning at soft tissue pogonion. It was concluded that lowe lip and chin response to mandibular advancement and advancement genioplasty is multi-factorial but can be accurtely and reliably predicted.

**Van Sickels JE, Hatch JP, Dolce C, Bays RA, Rugh JD. (2002)** [45] There are numerous risks for developing neurosensory deficits after a

bilateral sagittal split osteotomy (BSSO). The purpose of this study was to evaluate the effects of genioplasty, length of advancement, and age and their interactions in a group of patients undergoing BSSO advancement and followed up for 2 years.

**Edward W. Chang et al (2003)** explains that the technique of sliding advancement genioplsty can address abnormalities in three dimension o asymmetry including vertical microgenia with and without retrogenia, vertical macrogenia with retrogenia and prognathia.

**Stanton DC. (2003)** [39] Genioplasty has been a useful and frequently employed technique in the aesthetic facial surgeon's armamentarium. However, as the prevalence of obstructive sleep apnea becomes more apparent and its diagnosis more frequent, genioplasty has also evolved to a commonly performed procedure for reconstruction of the upper airway. This article discusses patient evaluation and surgical techniques used in aesthetic and functional surgery of the chin. Because these topics have been discussed extensively in the literature, this will serve as a synopsis of current techniques.

**Awwad Al-Bishri. (2004)** [3] stated that mandibular advancement and set back combined with genioplasty did not increase the incidence of

sencory disturbance and sensory changes after the osteotomies donot serve to be the main determinent of the patients satisfaction.

## SUMMARY & CONCLUSION

A retrospective cephalometric study that included 11 patients treated for retruded chin in sagittal direction from the department of Oral and Maxillofacial surgery, Ragas Dental College & Hospital from the year 2001 – 2004.

The following observations were presented in this study;

1. In group where, more than 6mm advancement is done, 1 case Menton (Me) has moved superiorly in the ratio of 1 : 0.35, and the other 2 cases it has moved inferiorly in the ratio of 1 : 0.57 and 1 : 0.31.
2. In group where, less than 6mm advancement is done; some cases, the Menton (Me) moved superiorly from 1 : 0.75 to 1 : 1, and other cases, inferior movement of the Menton in the ratio of 1 : 0.25 to 1 : 0.5

3. Apart from the unexpected change in the position of the Menton (Me) whether it either superior or inferior, the other complications include, unfavourable osteotomy of the posterior border, mental nerve transection, haemorrhage, infection from the plate, paresthesia and dysesthesia over the mental nerve regions.

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