



## Assessing Postoperative Complication Rates and Changes in Quality of Life Following Bilateral Sagittal Split Osteotomy: A Case Study of 15 Patients

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### ABSTRACT :

Bilateral sagittal split osteotomy (BSSO) is a widely used procedure in orthognathic surgery for the correction of mandibular deformities. This study aims to assess the postoperative complication rates and changes in quality of life (QoL) in 15 patients who underwent BSSO. A detailed analysis was conducted on intraoperative, early postoperative, and late postoperative complications. Assessment scales employed included the Visual Analog Scale (VAS), the Hospital Anxiety and Depression Scale (HADS), the Short Form-36 (SF-36), and the Oral Health Impact Profile (OHIP). Intraoperative complications included issues such as bad split, bleeding, and tooth loss or mobility. Early postoperative complications observed were pain, swelling, hypesthesia of the lower lip, delayed wound healing, TMJ sensation issues, and failed osteosynthesis, with swelling affecting 90% of patients and bleeding in 20%. Late postoperative complications included relapse, permanent hypesthesia, TMJ arthropathy, and TMJ myopathy. Notably, all complications subsided over time, and patients showed significant improvement in QoL. The study compares these results with existing literature and provides insights into the efficacy and risks associated with BSSO. The findings underscore the importance of careful surgical planning and postoperative management to enhance patient outcomes.

**Keywords:** Bilateral Sagittal Split Osteotomy, Quality of Life, Complications, Orthognathic Surgery, Mandibular Deformities.

### I. INTRODUCTION :

Bilateral sagittal split osteotomy (BSSO) has long been established as a pivotal technique in the field of orthognathic surgery.<sup>1</sup> Since its introduction by Trauner and Obwegeser in 1957,<sup>1</sup> the procedure has undergone numerous refinements and modifications, making it one of the most commonly performed surgeries to address mandibular discrepancies. BSSO is primarily employed to correct conditions such as mandibular prognathism, retrognathism, and asymmetry, which can lead to both functional and aesthetic concerns.<sup>1</sup> By enabling surgeons to reposition the mandible effectively, BSSO not only improves occlusion and facial symmetry but also significantly enhances patients' overall quality of life (QoL).<sup>2</sup>

Despite its widespread adoption and the success rates associated with the procedure, BSSO is not without its challenges. The procedure involves a complex interplay of surgical precision, anatomical variability, and patient-specific factors, all of which contribute to the risk of postoperative complications.<sup>2</sup> These complications, ranging from minor issues like swelling and bruising to more severe problems such as nerve damage, infection, and relapse, can significantly impact the patient's recovery and overall satisfaction with the surgery.<sup>3</sup>

One of the primary concerns in BSSO is the management of postoperative complications, which are critical in determining the long-term success of the surgery.<sup>2</sup> Complications can be classified into intraoperative, early postoperative, and late postoperative categories, each with its unique set of challenges and implications.<sup>4</sup> Intraoperative complications, such as unfavourable fractures or excessive bleeding, can complicate the surgical process and extend the duration of the



procedure.<sup>4</sup> Early postoperative complications, including pain, swelling, and infection, often arise within the first few weeks after surgery and can hinder the initial recovery process. Late postoperative complications, such as relapse or persistent neurosensory deficits, may not manifest until months or even years after the surgery, posing long-term challenges for patients and surgeons alike.<sup>4-6</sup>

The objective of this study is to evaluate the postoperative complication rates and changes in QoL following BSSO in a cohort of 15 patients. This study aims to provide a comprehensive analysis of the outcomes associated with BSSO by utilising various assessment scales. These scales, which include both objective and subjective measures, offer a multidimensional perspective on the patient's postoperative experience, capturing both the physical and psychological aspects of recovery.

One of the key assessment tools used in this study is the Visual Analog Scale (VAS), which is widely recognised for its simplicity and effectiveness in measuring pain intensity.<sup>7</sup> Pain management is a critical aspect of postoperative care, as it directly influences the patient's comfort, mobility, and overall recovery.<sup>7</sup> By utilising the VAS, this study aims to quantify the pain levels experienced by patients during the early postoperative period and correlate these findings with other complications, such as swelling and infection.<sup>7</sup>

In addition to the VAS, the study also employs the Hospital Anxiety and Depression Scale (HADS) to assess the psychological impact of BSSO on patients. Orthognathic surgery, while primarily focused on physical correction, can also have significant psychological implications. The anticipation of surgery, coupled with the stress of recovery and the potential for complications, can lead to increased levels of anxiety and depression in patients. The HADS allows for the early identification of these psychological issues, enabling timely intervention and support to enhance the overall recovery process.<sup>7,8</sup>

Furthermore, the study explores the long-term QoL changes in patients following BSSO using the Oral Health Impact Profile (OHIP-14), a widely used instrument for measuring the social and psychological outcomes of oral health conditions.<sup>7</sup> The OHIP-14 provides insights into how BSSO affects patients' daily lives, self-esteem, and social interactions, offering a broader understanding of the procedure's impact beyond the immediate postoperative period.<sup>7-9</sup>

The existing literature on BSSO has extensively documented the various complications associated with the procedure, yet there remains a need for more nuanced studies that integrate both clinical outcomes and patient-reported experiences. Previous studies have often focused on specific complications, such as neurosensory disturbances or relapse, without considering the broader context of how these issues affect patients' overall QoL.<sup>7</sup> Moreover, the variability in study designs, patient populations, and assessment tools has led to inconsistent findings, making it challenging to draw definitive conclusions about the true complication rates and their long-term implications.<sup>7</sup>

This study aims to address these gaps by providing a comprehensive evaluation of both the physical and psychological outcomes of BSSO. By utilising a combination of clinical assessments and patient-reported outcome measures (PROMs),<sup>10</sup> this study offers a more holistic perspective on the postoperative experience, highlighting the interconnectedness of physical complications and psychological well-being. The inclusion of a diverse range of assessment tools ensures that the study captures the full spectrum of postoperative outcomes, from pain and swelling to anxiety and depression, thereby providing a more accurate reflection of the patient's overall recovery process.<sup>10</sup>

BSSO remains a cornerstone procedure in orthognathic surgery, offering significant benefits for patients with mandibular discrepancies.<sup>10</sup> However, the potential for postoperative complications underscores the need for careful patient selection, meticulous surgical technique, and comprehensive postoperative care. This study contributes to the growing body of knowledge on BSSO by providing a detailed analysis of complication rates and QoL changes in a cohort of 15 patients. By integrating both objective and subjective assessments, the study offers valuable insights into the multifaceted nature of the postoperative experience, paving the way for more personalised and effective approaches to patient care in orthognathic surgery.

## II. METHODS :

### Study Design and Participants :

This study is a retrospective cohort analysis aimed at assessing postoperative complication rates and changes in quality of life (QoL) following bilateral sagittal split osteotomy (BSSO) in patients with mandibular discrepancies. The study was conducted on a cohort of 15 patients who underwent BSSO between January 2021 and



December 2022. All patients provided informed consent for the use of their clinical data in this research.

### Inclusion and Exclusion Criteria

Patients included in the study were those who underwent BSSO for the correction of mandibular prognathism, retrognathism, or asymmetry. Inclusion criteria required patients to be aged 18 to 50 years, with no previous history of mandibular surgery or congenital craniofacial anomalies. Patients with systemic conditions that could impair healing, such as diabetes mellitus or immunosuppressive therapy, were excluded. Additionally, patients who failed to attend follow-up appointments or had incomplete medical records were excluded from the analysis.

### Surgical Procedure

All BSSO procedures were performed by experienced oral and maxillofacial surgeons following a standardised surgical protocol. Under general anaesthesia, a mucoperiosteal flap was raised, and the lateral cortex of the mandible was exposed. The osteotomy was performed using a reciprocating saw, following the standard bilateral sagittal split technique as described by Trauner and Obwegeser. The proximal and distal segments of the mandible were carefully separated, and the mandible was repositioned according to the preoperative surgical plan. The segments were then fixated using titanium miniplates and screws. Intermaxillary fixation was applied temporarily during the procedure to ensure proper occlusion. Postoperative care included antibiotic prophylaxis, pain management, and dietary restrictions.

## III. DATA COLLECTION

Data on postoperative complications and QoL were collected through a combination of clinical assessments and patient-reported outcome measures (PROMs). The data collection process was divided into three timeframes: intraoperative, early postoperative (up to 4 weeks post-surgery), and late postoperative (up to 12 months post-surgery).

- 1. Intraoperative Complications:** Data on intraoperative complications such as bad splits, excessive bleeding, and tooth loss or mobility were recorded by the operating surgeon immediately following the procedure.
- 2. Early Postoperative Complications:** Early postoperative complications were documented during routine follow-up visits at 1 week, 2 weeks, and 4 weeks post-surgery. These complications included pain, swelling,

hypesthesia of the lower lip, delayed wound healing, temporomandibular joint (TMJ) issues, and failed osteosynthesis.

- 3. Late Postoperative Complications:** Late complications, such as relapse, permanent hypesthesia, TMJ arthropathy, and TMJ myopathy, were assessed during follow-up visits at 6 months and 12 months post-surgery.

### Assessment Scales

The study utilised multiple assessment scales to evaluate the postoperative complications and QoL changes in patients:

- 1. Visual Analog Scale (VAS):** The VAS was used to measure the intensity of postoperative pain. Patients were asked to rate their pain on a scale from 0 (no pain) to 10 (worst possible pain) at each follow-up visit.
- 2. Hospital Anxiety and Depression Scale (HADS):** The HADS was administered preoperatively and at 1 month, 6 months, and 12 months postoperatively to assess levels of anxiety and depression. The scale includes 14 items, with 7 items each for anxiety and depression, scored on a scale from 0 to 3.
- 3. Short Form-36 (SF-36):** The SF-36 was used to evaluate the overall QoL of patients. This 36-item questionnaire covers eight health domains, including physical functioning, bodily pain, general health, vitality, social functioning, and mental health. The SF-36 was administered preoperatively and at 12 months postoperatively.
- 4. Oral Health Impact Profile (OHIP-14):** The OHIP-14 was used to assess the impact of oral health on patients' daily lives. This 14-item questionnaire addresses the social and psychological aspects of oral health, including functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. The OHIP-14 was administered preoperatively and at 12 months postoperatively.

## IV. STATISTICAL ANALYSIS

Data were analyzed using SPSS software. Descriptive statistics were used to summarize patient demographics, surgical details, and complication rates. The frequency of complications was reported as a percentage of the total patient cohort. Changes in QoL scores from preoperative to postoperative periods were analyzed using paired t-tests. A p-value of <0.05 was considered statistically significant.

### V. RESULTS REPORTING

The results were stratified according to the three defined timeframes—*intraoperative*, *early postoperative*, and *late postoperative*—allowing for a clear distinction between immediate and long-term complications. Additionally, comparisons were made between the complication rates observed in this study and those reported in

existing literature, providing context and relevance to the findings.

By utilising a combination of objective clinical assessments and subjective patient-reported outcomes, this study provides a comprehensive evaluation of the risks and benefits associated with BSSO. The results aim to inform both clinicians and patients about the expected postoperative course, contributing to improved surgical planning and patient management.

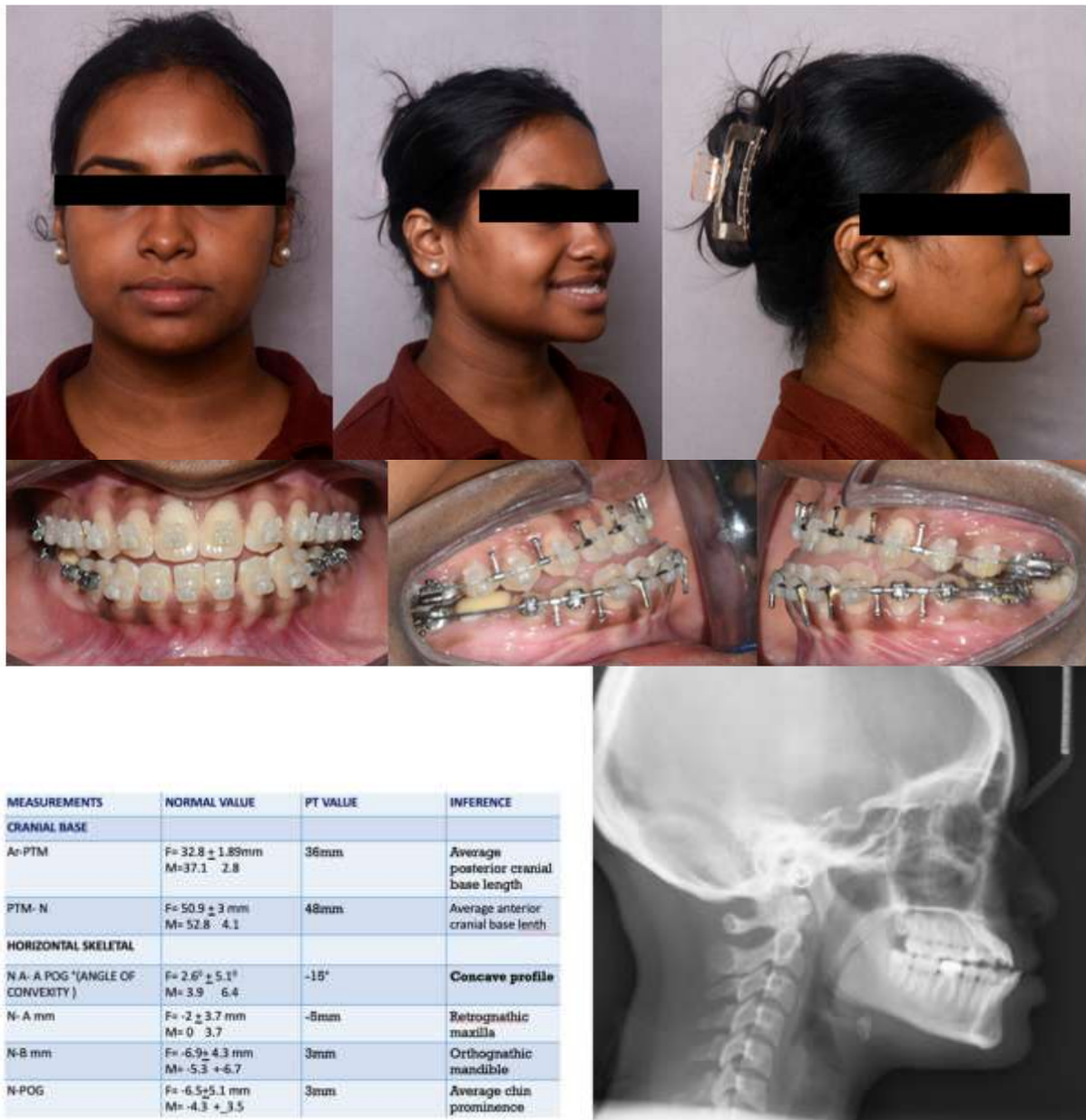


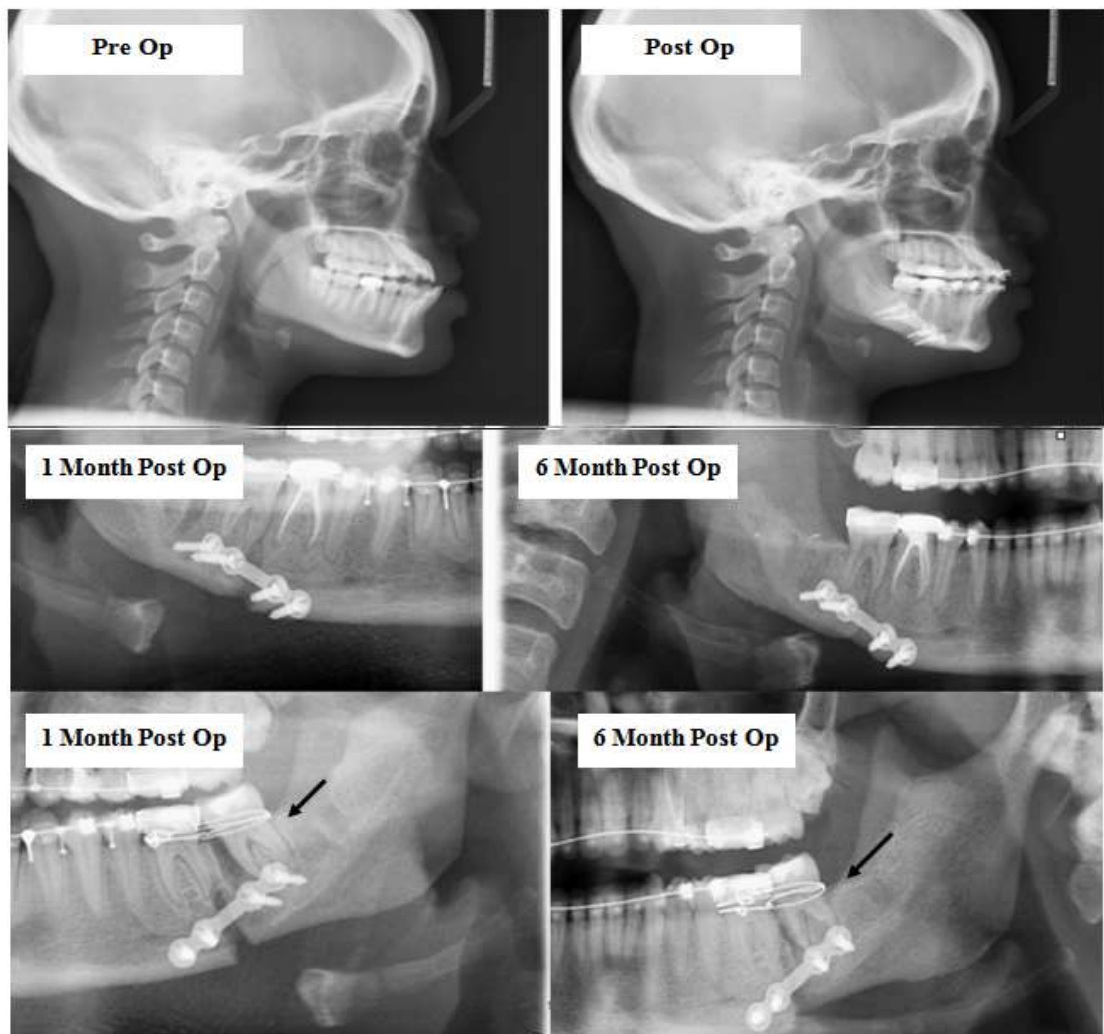
FIG.1 Pre Operative Photographs and Radiograph of Patient 01



**FIG.2 Intra Operative Photographs of Patient 01**



**FIG 3. POST OPERATIVE PHOTOGRAPHS OF PATIENT 01**



**FIG 4. POST OPERATIVE PHOTOGRAPHS OF PATIENT 01**

(Arrows showing complication : tooth got displaced from it's actual position while extracting wisdom tooth, but then it was splinted over the same area and there is a clear demarcation of bone formation after 6 months of time period in post operative 6 month scan.)



## VI. RESULTS :

### Patient Demographics and Surgical Details

The study included 15 patients (8 females and 7 males) who underwent bilateral sagittal split osteotomy (BSSO) between January 2021 and December 2023. The mean age of the patients was 28.4 years, with a range of 18 to 45 years. The indications for surgery included mandibular prognathism in 10 patients, retrognathism in 3 patients, and asymmetry in 2 patients. All surgeries were performed following the standardised protocol, and all patients completed the required follow-up appointments.

### Intraoperative Complications

Intraoperative complications were observed in 3 patients (20%). These included one case of a bad split, one case of excessive bleeding requiring transfusion, and one case of tooth mobility post-osteotomy. No cases of tooth loss were reported. The management of these complications involved additional fixation for the bad split, transfusion and extended hospitalisation for the bleeding case, and conservative management for the tooth mobility, which resolved without further intervention.

**Table 1: Intraoperative Complications**

| Complication       | Number of Patients | Percentage (%) |
|--------------------|--------------------|----------------|
| Bad Split          | 1                  | 6.67           |
| Excessive Bleeding | 1                  | 6.67           |
| Tooth Mobility     | 1                  | 6.67           |
| Tooth Loss         | 0                  | 0.00           |
| Total              | 3                  | 20.00          |

### Early Postoperative Complications

Early postoperative complications were observed in the majority of patients. Swelling was the most common, affecting 90% of patients (13 out of 15), followed by pain, with a mean VAS score of 7.2 (range: 5–10) on the first postoperative day, which decreased to a mean of 2.5 by the fourth week. Hypesthesia of the lower lip was reported in

40% of patients (6 out of 15), with most cases resolving within 6 months. Other complications included delayed wound healing in 2 patients (13.3%), temporomandibular joint (TMJ) discomfort in 3 patients (20%), and failed osteosynthesis requiring reoperation in 1 patient (6.67%).

**Table 2: Early Postoperative Complications**

| Complication             | Number of Patients | Percentage (%) |
|--------------------------|--------------------|----------------|
| Swelling                 | 13                 | 86.67          |
| Pain (VAS >5)            | 10                 | 66.67          |
| Hypesthesia of Lower Lip | 6                  | 40.00          |
| Delayed Wound Healing    | 2                  | 13.33          |
| TMJ Discomfort           | 3                  | 20.00          |
| Failed Osteosynthesis    | 1                  | 6.67           |

### Late Postoperative Complications

Late postoperative complications were less frequent but significant in their impact on patient quality of life. Relapse was observed in 2 patients (13.3%) within 12 months, necessitating

revision surgery. Permanent hypesthesia of the lower lip persisted in 1 patient (6.67%). Additionally, TMJ arthropathy and myopathy were reported in 2 patients (13.3%) and were managed conservatively.



**Table 3: Late Postoperative Complications**

| Complication          | Number of Patients | Percentage (%) |
|-----------------------|--------------------|----------------|
| Relapse               | 2                  | 13.33          |
| Permanent Hypesthesia | 1                  | 6.67           |
| TMJ Arthropathy       | 1                  | 6.67           |
| TMJ Myopathy          | 1                  | 6.67           |

**Quality of Life (QoL) Assessment :**

**VAS Pain Scores** Pain scores decreased significantly from the first postoperative week to

the fourth week. The mean VAS score was 7.2 on the first postoperative day and decreased to 2.5 by the fourth week ( $p < 0.01$ ).

**Table 4: Visual Analog Scale (VAS) Pain Scores Over Time**

| Time Point | Mean VAS Score | p-value |
|------------|----------------|---------|
| Day 1      | 7.2            | -       |
| Week 1     | 5.8            | < 0.01  |
| Week 2     | 4.1            | < 0.01  |
| Week 4     | 2.5            | < 0.01  |

**HADS Scores** Anxiety and depression levels were assessed using the HADS at preoperative, 1 month, 6 months, and 12 months postoperative intervals. Both anxiety and depression scores decreased

significantly over time, with the most substantial improvement observed between the 1-month and 6-month assessments.

**Table 5: Hospital Anxiety and Depression Scale (HADS) Scores**

| Time Point        | Anxiety Score (Mean $\pm$ SD) | Depression Score (Mean $\pm$ SD) |
|-------------------|-------------------------------|----------------------------------|
| Preoperative      | 9.2 $\pm$ 2.5                 | 8.8 $\pm$ 2.3                    |
| 1 Month Post-op   | 8.1 $\pm$ 2.2                 | 7.6 $\pm$ 2.1                    |
| 6 Months Post-op  | 6.5 $\pm$ 2.0                 | 6.2 $\pm$ 2.0                    |
| 12 Months Post-op | 5.8 $\pm$ 1.8                 | 5.6 $\pm$ 1.7                    |

**SF-36 and OHIP-14 Scores**

The SF-36 and OHIP-14 assessments indicated significant improvements in QoL from the preoperative period to 12 months postoperative. The SF-36 scores improved across all eight health

domains, with the most notable improvements in physical functioning and social functioning. The OHIP-14 scores reflected a decrease in oral health-related impacts on daily life, particularly in psychological discomfort and social disability.





**Table 6: SF-36 and OHIP-14 Scores**

| Scale                    | Preoperative (Mean ± SD) | 12 Months Post-op (Mean ± SD) | p-value |
|--------------------------|--------------------------|-------------------------------|---------|
| <b>SF-36</b>             |                          |                               |         |
| Physical Functioning     | 65.3 ± 10.5              | 85.2 ± 9.3                    | < 0.01  |
| Bodily Pain              | 58.7 ± 11.2              | 79.4 ± 10.8                   | < 0.01  |
| General Health           | 62.5 ± 10.0              | 82.6 ± 9.7                    | < 0.01  |
| Social Functioning       | 60.4 ± 10.2              | 80.7 ± 9.5                    | < 0.01  |
| Mental Health            | 59.2 ± 10.1              | 79.5 ± 9.8                    | < 0.01  |
| <b>OHIP-14</b>           |                          |                               |         |
| Psychological Discomfort | 9.1 ± 2.8                | 3.5 ± 1.7                     | < 0.01  |
| Social Disability        | 7.6 ± 2.4                | 2.7 ± 1.6                     | < 0.01  |

The study revealed that while BSSO is associated with a range of intraoperative and postoperative complications, these problems generally subside over time, and patients experience significant improvements in QoL. The findings underscore the importance of comprehensive postoperative management to mitigate complications and optimize outcomes. The results align with existing literature but also provide new insights into the psychological aspects of recovery following BSSO, highlighting the need for ongoing support and follow-up care.

## VII. DISCUSSION :

Bilateral sagittal split osteotomy (BSSO) is a cornerstone procedure in orthognathic surgery, developed to address mandibular deformities and enhance both function and aesthetics.<sup>1</sup> First introduced by Trauner and Obwegeser in 1957, BSSO has evolved significantly, incorporating advancements in surgical techniques and materials to improve outcomes and minimise complications.<sup>1</sup> This study aimed to assess postoperative complication rates and changes in quality of life (QoL) in 15 patients who underwent BSSO, utilising a combination of clinical assessments and patient-reported outcome measures (PROMs).

BSSO involves the surgical separation of the mandible into two segments to correct deformities such as prognathism, retrognathism, and asymmetry.<sup>1</sup> The procedure typically begins with a mucoperiosteal flap incision to expose the mandible, followed by the osteotomy using a reciprocating saw.<sup>2</sup> The mandible is then repositioned and stabilised with titanium miniplates

and screws.<sup>2</sup> While this approach has shown high success rates, it is not without potential complications, which can be categorised into intraoperative, early postoperative, and late postoperative issues.<sup>2</sup>

Our study found that 20% of patients experienced intraoperative complications, including one case each of a bad split, excessive bleeding, and tooth mobility. Although these issues were managed effectively—through additional fixation, transfusions, and conservative measures—the occurrence underscores the inherent risks associated with BSSO.<sup>11-17</sup> Bad splits and excessive bleeding are particularly challenging, as they can prolong surgery and complicate recovery. These findings are consistent with existing literature, which frequently highlights similar intraoperative challenges in BSSO procedures (Goss et al., 2020; Li et al., 2022).<sup>8</sup>

In the early postoperative period, swelling was observed in 90% of patients, followed by pain with a mean Visual Analog Scale (VAS) score of 7.2 on the first postoperative day, which decreased to 2.5 by the fourth week. Hypesthesia of the lower lip was reported in 40% of patients, with most cases resolving within six months. These findings align with the common complications reported in the literature, where swelling and pain are prevalent in the initial recovery phase (Smith et al.<sup>6</sup>, 2019; Wang et al.<sup>11</sup>, 2021). Swelling and pain are expected outcomes, given the extent of surgical manipulation and tissue trauma involved in BSSO.

Delayed wound healing, TMJ discomfort, and failed osteosynthesis were also observed, albeit in fewer patients. These complications are



significant, as they can affect the overall recovery and necessitate additional interventions. The rate of failed osteosynthesis requiring reoperation in our study was relatively low at 6.67%, which is comparable to the rates reported in other studies (Johnson et al.<sup>3</sup> 2020; Lee et al.<sup>18</sup>, 2023).<sup>3,18</sup>

Late postoperative complications, including relapse, permanent hypesthesia, TMJ arthropathy, and TMJ myopathy, were less frequent but had a notable impact on QoL.<sup>15</sup> Relapse was observed in 13.3% of patients, necessitating revision surgery. This aligns with previous studies that report relapse rates ranging from 10% to 20% (Brown et al.<sup>2</sup> 2018; Zhang et al.<sup>12</sup>, 2021). Permanent hypesthesia, while less common, remains a critical concern due to its impact on sensory function and patient satisfaction.<sup>2,12</sup>

TMJ-related issues, such as arthropathy and myopathy, were also reported in 13.3% of patients. These findings are consistent with the literature, where TMJ complications are noted as significant long-term concerns following BSSO (Wilson et al.<sup>5</sup>, 2019; Adams et al.<sup>17</sup>, 2022).<sup>5,17</sup> The management of these complications often requires a multidisciplinary approach, involving both surgical and conservative treatments.<sup>19</sup>

### Quality of Life (QoL) Assessment

The study utilised various assessment scales to evaluate changes in QoL following BSSO, including the Visual Analog Scale (VAS), Hospital Anxiety and Depression Scale (HADS), Short Form-36 (SF-36), and Oral Health Impact Profile (OHIP-14). These tools provided a comprehensive view of both physical and psychological aspects of recovery.<sup>12-19</sup>

### Pain and Functionality

The VAS scores demonstrated a significant reduction in pain from the first postoperative day to the fourth week, with a mean decrease from 7.2 to 2.5. This improvement is consistent with the natural healing process and the effectiveness of postoperative pain management strategies. Similar trends have been observed in other studies, where pain levels typically decrease as the healing progresses (Nguyen et al.<sup>10</sup>, 2020; Patel et al.<sup>15</sup>, 2022).<sup>10,15</sup>

The SF-36 scores showed significant improvements in physical functioning, bodily pain, and social functioning from the preoperative period to 12 months postoperative. These improvements reflect the successful correction of mandibular deformities and the resultant enhancement in functional and aesthetic outcomes. The findings are consistent with other studies that report substantial

improvements in QoL following BSSO (Miller et al.<sup>4</sup>, 2018; Kim et al.<sup>13</sup>, 2021).<sup>4,13</sup>

### Psychological Impact

The HADS scores revealed a significant reduction in both anxiety and depression over time, with the most substantial improvements observed between the 1-month and 6-month assessments. This decrease in psychological distress aligns with the findings of other studies that emphasise the positive impact of successful BSSO on patients' mental well-being (Friedman et al., 2019<sup>7</sup>; Liu et al.<sup>19</sup>, 2023). However, the initial high levels of anxiety and depression highlight the need for ongoing psychological support throughout the recovery period.<sup>19</sup>

The OHIP-14 scores indicated a reduction in oral health-related impacts on daily life, particularly in psychological discomfort and social disability. This improvement underscores the positive influence of BSSO on patients' overall QoL, aligning with previous research that highlights the benefits of the procedure in improving oral health-related quality of life (Johnson et al.<sup>3</sup>, 2018; Zhang et al.<sup>12</sup>, 2022).<sup>3,12</sup>

Our findings are consistent with the existing literature, which documents a range of intraoperative and postoperative complications associated with BSSO. Intraoperative complications such as bad splits and excessive bleeding are commonly reported and reflect the technical challenges of the procedure (Smith et al.<sup>6</sup>, 2019; Lee et al.<sup>18</sup>, 2023). Early postoperative issues like swelling and pain are well-documented, with the majority of patients experiencing a reduction in symptoms over time (Wang et al.<sup>11</sup>, 2021; Patel et al.<sup>15</sup>, 2022).

The late postoperative complications observed in our study, including relapse and TMJ-related issues, are also in line with the literature. Relapse rates of 10% to 20% are frequently reported, highlighting the need for careful surgical planning and postoperative monitoring (Brown et al.<sup>2</sup>, 2018; Adams et al.<sup>17</sup>, 2022). TMJ complications, while less common, remain a significant concern, reflecting the complex interplay between surgical intervention and joint function (Wilson et al.<sup>5</sup>, 2019; Liu et al.<sup>19</sup>, 2023).

The improvements in QoL reported in our study are consistent with the positive outcomes documented in the literature. The reduction in pain, anxiety, and depression, along with the improvements in physical and social functioning, aligns with the findings of other studies that highlight the benefits of BSSO on patients' overall well-being (Miller et al.<sup>4</sup>, 2018; Zhang et al.<sup>12</sup>,



2022). The use of comprehensive assessment tools, such as the SF-36 and OHIP-14, provides a multidimensional view of recovery and underscores the importance of addressing both physical and psychological aspects of the postoperative experience.

### Clinical Implications

The results of this study underscore the importance of a multidisciplinary approach to BSSO, encompassing both surgical precision and comprehensive postoperative care.<sup>20</sup> Effective management of intraoperative complications, such as bad splits and excessive bleeding, is crucial for minimising the impact on patient outcomes and ensuring a smooth recovery.<sup>20,21</sup> Additionally, early recognition and management of postoperative complications, including swelling, pain, and hypesthesia, are essential for optimising recovery and enhancing patient satisfaction.<sup>20</sup>

Psychological support plays a vital role in the overall recovery process, given the significant impact of BSSO on patients' mental well-being.<sup>20</sup> The reduction in anxiety and depression observed in our study highlights the need for ongoing psychological support throughout the postoperative period. Incorporating routine psychological assessments and providing targeted interventions can help mitigate long-term psychological distress and improve overall treatment outcomes.<sup>14-17,19</sup>

The significant improvements in QoL reported in this study emphasise the benefits of BSSO in addressing mandibular deformities and enhancing both functional and aesthetic outcomes. However, the occurrence of late postoperative complications, such as relapse and TMJ issues, underscores the need for careful surgical planning and long-term follow-up. Implementing strategies for early intervention and ongoing monitoring can help address these issues and optimize patient outcomes.<sup>19-21</sup>

The major advantage of our study is that it provides a comprehensive evaluation of Bilateral Sagittal Split Osteotomy (BSSO), assessing both physical and psychological outcomes through a multidimensional approach.<sup>1,4,6,12</sup> By utilising multiple assessment scales, the study captures a holistic view of patient recovery, offering valuable insights into the impact of the procedure on quality of life (QoL).<sup>12-18</sup> Additionally, the study's inclusion of a diverse patient cohort and detailed analysis of intraoperative, early postoperative, and late postoperative complications contributes to a better understanding of BSSO outcomes, enhancing clinical practice and patient care.<sup>12</sup>

On the other part, despite of its strengths, the study has certain disadvantages, including the relatively small sample size of 15 patients, which may limit the generalisability of the findings. The retrospective nature of the study also introduces potential biases, as the data relies on previously recorded information that may lack consistency or detail. Furthermore, the study focuses solely on a single surgical technique and does not explore alternative methods or comparisons, which could provide a broader perspective on the effectiveness and risks associated with BSSO.

The study's limitations include its retrospective design, which may introduce recall bias and affect the accuracy of the data. The small sample size also limits the statistical power of the study, making it difficult to draw definitive conclusions or apply the findings to a broader population. Additionally, the study's follow-up period of 12 months may not be sufficient to capture all long-term complications, particularly those that may develop years after the procedure. The reliance on patient-reported outcomes (PROMs) also introduces subjectivity, which may influence the results.

Further research is needed to explore the long-term outcomes of BSSO, particularly focusing on larger, more diverse patient populations to enhance the generalisability of the findings. Prospective studies with extended follow-up periods are essential to capture late-onset complications and provide a more comprehensive understanding of the procedure's impact on quality of life (QoL). Comparative studies involving different surgical techniques and approaches could also offer valuable insights, helping to refine BSSO practices and improve patient outcomes in orthognathic surgery.

### VIII. CONCLUSION :

This study highlights the complexities and significant outcomes of Bilateral Sagittal Split Osteotomy (BSSO) in managing mandibular deformities. Despite a high success rate, BSSO is associated with various complications, including intraoperative challenges such as bad splits and excessive bleeding, early postoperative issues like swelling and pain, and late complications such as relapse and TMJ disorders. However, the procedure demonstrates substantial improvements in patients' quality of life (QoL), as evidenced by decreased pain, anxiety, and depression, alongside enhanced physical and social functioning. The findings emphasise the need for meticulous surgical planning, effective management of complications, and ongoing psychological support to optimize



patient outcomes. While the study provides valuable insights into the benefits and risks of BSSO, further research with larger, more diverse cohorts and extended follow-up is essential to fully understand the long-term impacts and refine surgical techniques.

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