Short Communication

Midline IMF-screw Wire Handle for Chin Segment Control in Genioplasty: A Technical Note

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ABSTRACT

Background: Achieving precise three-dimensional control of the chin segment during genioplasty is crucial for an optimal outcome. However, traditional methods using hands, clamps, or forceps can obstruct the surgical field and increase the risk of rotational errors. This paper describes a straightforward technique looping a stainless-steel wire through a single midline intermaxillary-fixation (IMF) screw to create a temporary handle that provides excellent control without impeding the osteotomy site.

Methods: After the chin segment is osteotomized and mobilized, a single IMF screw is placed at the symphyseal midline of the inferior mobile segment. This placement is performed under direct vision, ensuring it is clear of tooth apices and mental foramina. A stainless-steel wire is then looped through the head of the screw to form a rigid handle. This handle allows for controlled translation and rotation, enabling precise contouring and fixation of the bilateral plates. The handle is removed prior to wound closure.

Results: In an adult case, this wire handle allowed precise anteroposterior and vertical translation, as well as controlled rotation. The technique eliminated the need for manual manipulation that could obstruct drilling and screw insertion. No intraoperative complications were observed. The maneuver required minimal additional time and no specialized instruments, using only a standard IMF screw and wire.

Conclusion: The midline IMF-screw wire handle is a low-cost and reproducible adjunct that significantly facilitates the manipulation of the chin segment during genioplasty. With careful placement, this technique can improve both the accuracy of the procedure and the overall surgical workflow.

KEYWORDS
Genioplasty; Intermaxillary Fixation Screw; Mandible; Osteotomy; Segment Control; Orthognathic Surgery

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INTRODUCTION

Accurate repositioning of the chin segment is essential for a successful genioplasty, affecting both function and aesthetics. Segment stability is crucial for achieving proper symmetry, projection, and neurosensory results [1].

Traditional methods, such as using fingers, bone-holding forceps, or reduction clamps, can block the surgical field, lead to asymmetry, and risk injuring the mental nerve. These techniques may interfere with the final fixation and lack the fine control needed for precise plating [2]. To solve these problems, intermaxillary fixation (IMF) screws have been suggested as a minimally invasive way to get a solid grip on bone segments during repositioning. This approach has already been shown to be useful in orthognathic and trauma surgeries for guiding and holding bone during fixation [3].

In this technique, a single IMF screw is placed in the middle of the mobilized chin segment and secured with a wire to create a rigid handle. This handle provides three-dimensional control of the chin during plating while keeping the surgical area clear of hands or clamps [4]. Compared to complex tools like 3D-printed guides or navigation systems, this method is affordable, widely available, and adds very little time to the procedure. Even research on digital planning has noted the importance of simple, intraoperative aids to maintain accuracy when patient-specific guides are not an option [5].

This technical note will outline the step-by-step process of using a wire-handled IMF screw to control the chin segment during genioplasty, providing a method that is precise, safe, and simple.

METHODS

Following genioplasty exposure and completion of the osteotomy by the surgeon's routine method, the chin segment is mobilized. A single IMF screw is inserted at the midline into the inferior portion of the mobile segment destined for repositioning. A stainless-steel wire is passed through the screw head and secured to create a rigid handle. The segment is manipulated by the wire handle to the planned position while an assistant maintains retraction. Bilateral low-profile plates are then contoured and fixed across the osteotomy with the handle maintaining steady control. After stability and symmetry are confirmed, the wire handle and IMF screw are removed unless retention is specifically desired, and the wound is irrigated and closed in layers.

The maneuver uses one IMF screw placed at the midline of the mobile segment and a length of stainless-steel wire to create the handle, in addition to standard plating hardware and routine genioplasty instruments.

In an adult patient, a midline IMF screw was inserted into the inferior mobile segment and wired to form a handle. The handle provided firm purchase for controlled three-dimensional manipulation while bilateral plates were adapted and fixed. Intraoperative images show the wire handle in use during positioning and the final symmetric plating before the handle was removed (Figure 1).

The technique offers precise, repeatable control of the segment, keeps fingers away from the osteotomy during plating, and adds negligible cost or time. As a temporary aid it does not replace definitive fixation. Excessive traction should be avoided to prevent stress on thin cortices, and care near the mental nerve remains essential.

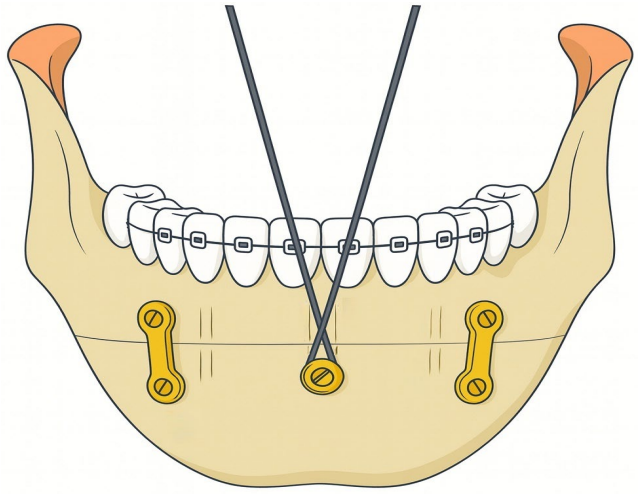


Figure 1: Wire-handled IMF screw technique for chin segment control during genioplasty. A single midline screw with wire loop enables stable, hands-free manipulation during plating

RESULTS

A 22-year-old male underwent advancement genioplasty. Following the osteotomy and mobilization of the segment, a single midline IMF screw was placed in the inferior mobile segment. This screw was then looped with stainless-steel wire to create a handle.

This wire handle allowed for firm, controlled manipulation of the bone segment in all directions—antero-posterior and vertical translation, as well as rotation. This was done while low-profile plates were contoured and fixed bilaterally. The handle provided clear access to the osteotomy line, allowing for direct vision during drilling and screw insertion without obstruction from hands or clamps. Because of this control, no repeated repositioning was needed.

The procedure had no intraoperative complications; there was no screw loosening or cortical splitting at the entry site, and the mental nerves were intact upon closure. The use of this maneuver added about 3 minutes to the plating phase and didn't require any instruments beyond a standard IMF screw and wire. The handle and screw were removed before closing.

An early postoperative check showed a symmetrical chin with good midline alignment and unchanged occlusion. Lower-lip/chin sensation was slightly reduced, but it resolved completely by 8 weeks.

DISCUSSION

Achieving precise control of the chin segment during genioplasty is essential for symmetric, stable, and predictable results. However, manipulating the segment during plating can be difficult due to limited visibility, hand obstruction, or inadequate instrument control, especially in tight surgical spaces. Traditional methods, such as using finger pressure, bone-holding forceps, or clamps, offer temporary control but may increase the risk of segment rotation, asymmetry, or irritation to the mental nerve [6].

The use of a single intermaxillary fixation (IMF) screw, placed in the middle of the mobilized segment and secured with a wire to create a rigid handle, offers a dependable solution to these problems. This handle allows for precise three-dimensional control of the segment during plating without hands or clamps blocking the osteotomy line. This allows for clear visualization and steady positioning along the anteroposterior, vertical, and rotational axes [7].

Compared to more advanced technologies like 3D-printed guides or navigation systems, the wire-handled IMF screw technique is a low-cost, low-tech alternative that uses standard instruments. While digital planning can improve surgical accuracy, it requires imaging software, preoperative design, and custom fabrication. In contrast, this technique only needs an IMF screw and surgical wire, and adds minimal time to the procedure [8].

Additionally, IMF screws improve surgical ergonomics and reduce hand fatigue, while also minimizing soft-tissue trauma and glove perforation. These benefits could lead to better surgeon comfort and efficiency during segment positioning and plating [9].

While the technique is generally safe, caution is needed when placing the screw. Too much force, incorrect positioning, or thin mandibular bone can lead to complications like cortical fractures or loss of fixation. As with all instruments used near the mental foramen, proper retraction and direct visualization are crucial to avoid nerve injury [10].

It is important to stress that this technique is meant to be a temporary aid for segment control and not a replacement for permanent fixation. Once the plates are secured and stability is confirmed, the wire and IMF screw are removed before closing, leaving no extra hardware behind.

CONCLUSION

The wire-handled IMF screw technique provides a simple, efficient, and effective way to control the chin segment during genioplasty. Its low cost, accessibility, and reproducibility make it especially valuable when advanced planning tools are not available. Its ergonomic advantages also improve both precision and workflow in the operating room.

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ETHICAL CONSIDERATIONS

This technical note describes a modification to standard genioplasty. The patient provided written informed consent.

CONFLICT OF INTEREST

None declared.

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