

Orthodontic Bracket–Supported Immediate Provisionalization Following Immediate Implant Placement with the Socket Shield Technique in the Esthetic Zone: A Clinical Report

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Abstract

Background: Immediate implant placement in the aesthetic zone using the socket shield technique has been recommended for preserving the facial hard and soft tissue architecture following tooth extraction. Immediate implant supported provisionalization is desirable for maintenance of peri-implant soft tissue contours. However, it is dependent on the achievement of adequate primary implant stability. The present report describes a novel approach to immediate provisionalization with existing orthodontic brackets after immediate implant placement with the socket shield technique where immediate implant loading was contraindicated.

Case Presentation: A 17-year-old patient who had recently completed fixed orthodontic treatment presented with a non-restorable maxillary central incisor requiring extraction. Preoperative skeletal maturity was confirmed via a hand-wrist radiograph demonstrating complete epiphyseal fusion before implant placement. After atraumatic decoronation and preparation of the facial window of the socket, a 4.0 × 14 mm implant was placed in the palatal portion of the extraction socket. The primary stability achieved was 25 Ncm, which was considered inadequate for immediate implant-supported provisionalization. The existing orthodontic brackets were repurposed to support a fixed, non-functional provisional restoration to maintain esthetics and avoid functional loading of the implant. Postoperative healing was uneventful, with satisfactory maintenance of the peri-implant soft tissue profile during the early healing period.

Conclusion: When primary stability is insufficient for immediate implant loading, orthodontic bracket-assisted provisionalization offers a straightforward, minimally invasive, and Cost effective option for rapid esthetic rehabilitation following immediate implant insertion using the socket shield procedure.

Clinical Importance: In addition to preserving esthetics and safeguarding the implant during osseointegration, repurposing existing orthodontic brackets eliminates the need for additional temporary appliances. This method serves as an excellent clinical alternative for patients who have recently completed orthodontic treatment and require immediate implant placement in the esthetic zone.

Keywords: Orthodontic brackets; socket shield technique; immediate implant placement; immediate provisionalization; esthetic zone; dental implants; primary stability

Introduction

Replacing a single tooth in the esthetic zone is one of the most challenging interventions in implant dentistry. Successful rehabilitation depends heavily on both predictable osseointegration and the long-term preservation of the surrounding hard and soft tissue architecture. Immediate implant placement offers well-documented advantages, including fewer surgical procedures, shorter treatment times, and accelerated rehabilitation. However, even with optimal implant positioning, physiologic post-extraction remodeling of the facial alveolar bone often jeopardizes peri-implant tissue stability and esthetic outcomes. Consequently, minimizing facial hard and soft tissue collapse remains a primary objective of modern implant therapy.^[1-3]

To address this challenge, Hürzeler et al. introduced the Socket Shield Technique (SST), which involves intentionally retaining the buccal root fragment during immediate implant placement. This fragment preserves the periodontal ligament, bundle bone, and facial cortical plate, significantly reducing post-extraction tissue collapse. The method has since evolved under the broader concept of Partial Extraction Therapy (PET), with numerous clinical modifications introduced to optimize outcomes. Recent systematic reviews and meta-analyses demonstrate that SST yields enhanced peri-implant soft tissue preservation, less buccal bone resorption, favorable implant longevity, and superior esthetic results compared to conventional immediate implant placement. Nevertheless, because the available evidence is still developing, careful patient selection and meticulous surgical execution remain vital.^{1-4]} Immediate provisionalization is equally essential in esthetic implant therapy because it maintains the emergence profile, supports the surrounding soft tissues, and provides immediate psychological relief to the patient. However, immediate implant-supported provisionalization requires robust primary implant stability. Attempting immediate loading without adequate insertion torque increases implant micromotion, which can jeopardize osseointegration. In such scenarios, clinicians must utilize alternative provisionalization techniques that preserve anterior esthetics while completely shielding the implant from functional loads.^[5,6]

Various interim prosthetic strategies have been described to maintain esthetics during osseointegration, including removable partial dentures, vacuum-formed retainers (Essix appliances), resin-bonded Maryland bridges, and fiber-reinforced adhesive bridges. While clinically viable, these methods present inherent limitations concerning patient comfort, extensive laboratory processing, costs, oral hygiene maintenance, or the unnecessary preparation of adjacent teeth. Conversely, bracket-supported or "riding" pontics have been utilized as a conservative, simple strategy to temporarily replace missing anterior teeth during active orthodontic treatment by leveraging the existing appliance.

To the authors' knowledge, the use of retained orthodontic brackets to support a fixed, non-functional provisional restoration immediately after socket shield surgery—specifically when immediate implant loading is contraindicated due to low primary stability—has not been previously documented. This clinical report outlines a simple, minimally invasive, and cost-effective approach to managing a non-restorable maxillary central incisor using immediate implant placement, the socket shield technique, and an interim restoration entirely supported by the patient's existing orthodontic appliance.^[7]

Case Report

A healthy 17-year-old male presented to the Department of Prosthodontics with a chief complaint of a fractured maxillary right central incisor (tooth #11) and requested a fixed replacement. The patient had sustained dental trauma resulting in an Ellis Class VIII fracture, rendering the tooth non-restorable. His

medical history was non-contributory, with no systemic illnesses, history of smoking, or medications that could compromise bone healing. The patient had completed a comprehensive course of fixed orthodontic treatment one month prior. Following the completion of active therapy, the orthodontic brackets were intentionally retained to preserve the edentulous space and facilitate the planned implant-supported prosthetic rehabilitation.

Clinical examination revealed satisfactory oral hygiene, healthy adjacent teeth, and adequate mesiodistal and buccopalatal space for implant placement (**Fig. s 1 and 2**). Radiographic evaluation using panoramic radiography (**Fig. 3**) and cone-beam computed tomography (CBCT) demonstrated adequate alveolar bone volume, an intact facial cortical plate, and favorable anatomical conditions for immediate implant placement. Intraoral periapical radiography confirmed extensive coronal destruction with an unfavorable restorative prognosis (**Fig. 4**). Given the patient's young age, skeletal maturity was assessed preoperatively using a hand-wrist radiograph (**Fig. 5**), which confirmed complete epiphyseal fusion and permitted the commencement of implant therapy.

Based on these findings, a diagnosis of a non-restorable Ellis Class VIII fracture of tooth #11 was established. After discussing various treatment modalities—including delayed implant placement and conventional provisional options—immediate implant placement combined with the Socket Shield Technique (SST) was selected to optimize esthetic results and preserve the anterior maxilla's tissue architecture. Immediate implant-supported provisionalization was planned only if optimal primary stability could be achieved intraoperatively. If immediate loading was contraindicated, the intentionally retained orthodontic appliance presented a unique opportunity to support a fixed provisional restoration without altering the adjacent teeth. Informed written consent was obtained from the patient and his legal guardian prior to initiating the procedure.

Table 1: Chronological Timeline of Clinical Procedures

Stage	Procedure
Initial visit	Clinical examination, radiographs, CBCT, treatment planning
Preoperative	Hand–wrist radiograph confirming skeletal maturity
Surgery	Socket shield preparation and immediate implant placement
Same visit	Bracket-supported fixed provisional restoration
1 week	Clinical review and soft tissue evaluation
3–4 months	Definitive implant restoration (planned)



Fig. 1 Pre- Op



Fig. 2 Pre-Op Occlusal View



Fig. 3 Pre - Op OPG



Fig. 4 Pre-Op RVG



Fig. 5 Hand Wrist Radiograph

Surgical Procedure

Following the administration of local anesthesia, the fractured crown was decoronated to facilitate controlled root preparation while safeguarding the integrity of the facial root fragment (**Fig. 6**). A flapless approach was adopted to minimize disruption to the periosteal blood supply and maintain the existing soft tissue architecture.

The root was sectioned mesiodistally using a long-shank tapered diamond bur under copious sterile saline irrigation (**Fig. 7**), dividing the root structure into distinct buccal and palatal halves (**Fig. 8**). The palatal root fragment was carefully mobilized and removed atraumatically (**Fig. 9**), while the facial fragment was intentionally left in place to create the socket shield. The retained shield was contoured to a thickness of

approximately 1.5–2.0 mm and reduced to the level of the alveolar crest. The definitive stability of the shield was verified clinically before proceeding.

Sequential osteotomy preparation was performed palatally to the retained shield, ensuring a safe distance from the root fragment to prevent displacement. A Dentis SQ implant (4.0 × 14 mm) was placed in an ideal three-dimensional prosthetic position within the palatal aspect of the socket (**Fig. 10**). A primary implant stability of 25 Ncm was achieved upon definitive insertion. Because this torque value was insufficient for predictable immediate implant-supported loading, a cover screw was placed, and direct provisional loading was avoided to prevent micro-motion and protect the osseointegration process (**Fig. 11**). No grafting material was placed in the jumping gap, as adequate stability of the retained shield and implant position were achieved. The surgical site was irrigated thoroughly with sterile saline, and soft tissue closure was achieved using 3-0 braided silk sutures (**Fig. 12**). A postoperative periapical radiograph was obtained to confirm the precise placement of the implant fixture (**Fig. 13**).



Fig. 6 Decoronation and atraumatic root exposure



Fig. 7 Sectioning of root piece



Fig. 8 Root sectioned in buccal and palatal halves



Fig. 9 Palatal Half extracted atraumatically



Fig. 10 *Implant Fixture placed palatally*



Fig. 11 *Fixture and cover screw with 1-1.5mm retained buccal shield segment*



Fig. 12 *Surgical site irrigated and sutured*

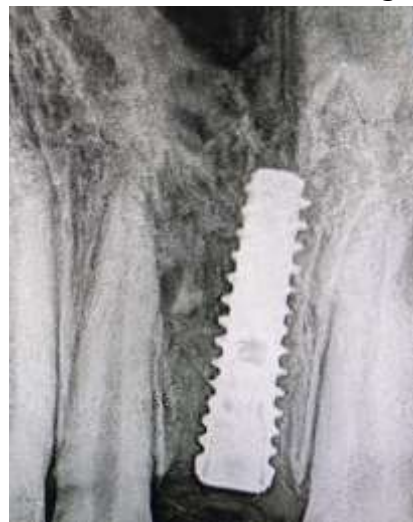
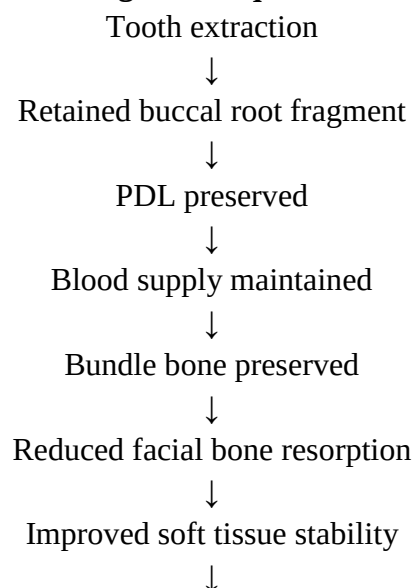


Fig. 13 *Postoperative periapical radiograph*

Biological Rationale of the Socket Shielding Technique



Better esthetic outcome

Clinical Considerations for Socket Shielding Technique

Indications	Contraindications
Intact buccal plate	Active infection involving buccal root
Immediate implant in esthetic zone	Mobile root fragment
Non-restorable tooth	Vertical root fracture extending buccally
Adequate apical bone	Severe periodontal destruction

Immediate Provisionalization

Because the implant reached a primary stability of only 25 Ncm, an alternative provisionalization method was executed to avoid immediate implant loading. Since the patient's orthodontic brackets and archwire had been intentionally left in place after active therapy, they were utilized to establish a stable, fixed, non-functional provisional restoration.

An appropriately sized acrylic denture tooth was selected and modified to replicate the precise contour and dimensions of the contralateral maxillary central incisor (**Fig. 14**). The palatal surface of the acrylic tooth was relieved to accommodate the orthodontic bracket assembly, and the bracket was bonded securely to the provisional crown (**Fig. 15**). The modified acrylic tooth was then engaged into the archwire assembly over the edentulous site. This design created a fixed provisional restoration that remained entirely independent of the underlying implant fixture.

The occlusion was carefully checked and adjusted to eliminate all centric and eccentric contacts, preventing any functional force transmission to the healing implant. This provisional approach provided immediate esthetic rehabilitation and supported the peri-implant soft tissues without requiring a removable appliance or a resin-bonded bridge.

The patient received routine postoperative instructions, standard medications, and advice on maintaining meticulous oral hygiene around the surgical site and the provisional restoration. Suture removal was performed at two weeks, revealing uneventful healing and satisfactory soft tissue adaptation around the implant site (**Fig. 16**). The bracket-supported restoration remained stable, aesthetic, and functional as a space maintainer throughout the initial healing phase (**Fig. 17**).



Fig. 14 Acrylic Tooth



Fig. 15 Bracket bonded to acrylic tooth



Fig. 16 Post op after suture Removal



Fig. 17 Post op with provisional acrylic restoration supported by orthodontic bracket and archwire

DISCUSSION

Immediate implant placement has become a predictable treatment modality for replacing single teeth in the esthetic zone owing to reduced treatment time, fewer surgical interventions, and improved preservation of peri-implant hard and soft tissues. Nevertheless, physiologic remodeling of the facial bundle bone following tooth extraction remains an important cause of gingival recession and compromised esthetic outcomes. The Socket Shield Technique (SST) was developed to address this limitation by intentionally retaining the buccal root fragment, thereby preserving the periodontal ligament and its vascular supply to the facial cortical plate. Recent systematic reviews have reported encouraging implant survival rates together with superior preservation of buccal tissues and improved esthetic outcomes compared with conventional immediate implant placement, although the quality of available evidence remains limited and the technique continues to require meticulous surgical execution and careful case selection.^{1–4}

Provisional restoration plays a crucial role in immediate implant therapy, particularly in the anterior maxilla, where preservation of the peri-implant soft tissue architecture and patient esthetics are primary concerns. Besides restoring appearance, provisional restorations support the peri-implant soft tissues and help guide emergence profile development during healing. However, these benefits should not compromise implant stability during the critical phase of osseointegration. Implant-supported immediate provisionalization is therefore generally recommended only when adequate primary stability has been achieved, as excessive micromotion during the early healing period may adversely affect osseointegration.⁵

The principal challenge in the present case was not implant placement but provisional rehabilitation. Immediate implant-supported provisionalization was intentionally avoided because the achieved primary stability of 25 Ncm was considered insufficient to justify immediate implant-supported loading in the present case. Consequently, an alternative solution was required that could provide immediate replacement of the missing tooth, preserve the peri-implant soft tissue profile, maintain the edentulous space, and remain completely independent of the implant throughout the healing period.

The patient had completed comprehensive fixed orthodontic treatment only one month before implant placement, and the orthodontic appliance had intentionally been retained until definitive prosthetic rehabilitation. This clinical situation provided an opportunity to utilize the retained orthodontic brackets and archwire as a stable means of supporting a fixed provisional restoration without transmitting functional forces to the implant. Unlike removable partial dentures or resin-bonded provisional restorations, this approach required no preparation of adjacent teeth or additional laboratory procedures

while restoring anterior esthetics immediately and maintaining the edentulous space throughout the healing phase.

Conventional provisionalization methods following immediate implant placement include removable acrylic partial dentures, vacuum-formed retainers with pontics, resin-bonded fixed provisional restorations, fiber-reinforced composite bridges, and implant-supported provisional restorations. Although these techniques are clinically effective, each has inherent limitations. Removable provisional restorations are highly dependent on patient compliance and are typically removed during mastication, thereby limiting continuous support of the peri-implant soft tissues. Resin-bonded and fiber-reinforced provisional restorations provide fixed rehabilitation but require bonding to adjacent teeth and may involve additional clinical or laboratory procedures.⁸ In patients who have recently completed orthodontic treatment, however, the retained orthodontic appliance may provide an opportunity for an alternative fixed provisionalization strategy without additional intervention.

Sharma et al. described the riding pontic as an esthetic space maintainer during active orthodontic treatment in patients awaiting definitive prosthetic replacement. In contrast, the present report demonstrates the use of retained orthodontic brackets following completion of orthodontic treatment to support a fixed, non-functional provisional restoration after immediate implant placement. This approach repurposes the existing orthodontic appliance to restore anterior esthetics while completely avoiding functional loading of the implant during the critical healing period.⁷

The present technique offers several clinical advantages. It utilizes an appliance already present in the patient's mouth, thereby avoiding preparation of adjacent teeth, additional laboratory procedures, and fabrication of a separate provisional prosthesis. Furthermore, it maintains the edentulous space, supports the peri-implant soft tissue profile, and eliminates functional loading of the implant during the critical healing period. These features make it a practical, minimally invasive, and cost-effective provisionalization option in carefully selected patients who have recently completed orthodontic treatment. In addition, the fixed nature of the provisional restoration may improve patient comfort and esthetic acceptance compared with removable provisional appliances.

Despite its advantages, the present report has certain limitations. The technique is applicable only in patients with retained orthodontic appliances and therefore cannot be generalized to all cases requiring immediate implant placement. Furthermore, this report represents a single clinical case with short-term follow-up. Long-term prospective clinical studies involving larger patient cohorts are required to validate the predictability, patient acceptance, and long-term clinical outcomes of this provisionalization approach. Within the limitations of this report, orthodontic bracket-supported provisionalization appears to be a simple, minimally invasive, and cost-effective alternative for temporary rehabilitation following immediate implant placement when immediate implant-supported loading is not indicated. By utilizing an existing orthodontic appliance, the technique provides satisfactory esthetics, preserves the peri-implant soft tissue profile, allows undisturbed osseointegration, and avoids additional intervention or preparation of adjacent teeth.

Conclusion

Orthodontic bracket-supported provisionalization may represent a simple, minimally invasive, and cost-effective alternative for temporary rehabilitation following immediate implant placement when immediate implant-supported provisionalization is not indicated. By utilizing an existing orthodontic appliance, this technique provides immediate esthetic replacement of the missing tooth while preserving the peri-implant

soft tissue profile and eliminating functional loading of the implant during the critical phase of osseointegration. Although its application is limited to carefully selected patients with retained orthodontic appliances, this technique offers a practical provisionalization strategy that warrants further evaluation in prospective clinical studies.

References

1. Hu"rzeler MB, Zuhr O, Schupbach P, Rebele SF, Emmanouilidis N, Fickl S. The socket shield technique: a proof-of-principle report. *J Clin Periodontol* 2010; 37: 855–862. doi: 10.1111/j.1600-051X.2010.01595.x
2. Scarano, A.; Di Carmine, M.; Al-Hamed, F.S.; Khater, A.G.A.; Gehrke, S.A.; Tari, S.R.; Leo, L.; Inchingolo, F.; Lorusso, F. Socket Shield Technique to Improve the Outcomes of Immediate Implant: A Systematic Review and Meta-Analysis. *Prosthesis* 2023, 5, 509–526. <https://doi.org/10.3390/prosthesis5020035>
3. Atieh MA, Shah M, Abdulkareem M, AlQahtani HA, Alsabeeha NHM. The socket shield technique for immediate implant placement: A systematic review and meta-analysis. *J Esthet Restor Dent*. 2021 Dec;33(8):1186-1200. doi: 10.1111/jerd.12812. Epub 2021 Aug 11. PMID: 34380176.
4. Kumar PR, Kher U. Shield the socket: Procedure, case report and classification. *J Indian Soc Periodontol* 2018;22:266-72.
5. Gallucci GO, Benic GI, Eckert SE, Papaspyridakos P, Schimmel M, Schrott A, Weber HP. Consensus statements and clinical recommendations for implant loading protocols. *Int J Oral Maxillofac Implants*. 2014;29 Suppl:287-90. doi: 10.11607/jomi.2013.g4. PMID: 24660204.
6. Javed F, Romanos GE. The role of primary stability for successful immediate loading of dental implants. A literature review. *J Dent*. 2010 Aug;38(8):612-20. doi: 10.1016/j.jdent.2010.05.013. Epub 2010 Jun 11. PMID: 20546821.
7. Sharma NS. Riding Pontic: A Tool to Keep Patients Smiling. *Int J Clin Pediatr Dent* 2013;6(2): 127-131.
8. Pitman J, Seyssens L, Christiaens V, Cosyn J. Immediate implant placement with or without immediate provisionalization: A systematic review and meta-analysis. *J Clin Periodontol*. 2022 Oct;49(10):1012-1023. doi: 10.1111/jcpe.13686. Epub 2022 Jul 15. PMID: 35734911.