

The Use of Platelet Rich Fibrin (PRF) in Immediate Implant Placement in the Aesthetic Zone

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Introduction

Autologous platelet concentrates have gained increasing popularity in regenerative medicine and implant dentistry over the last three decades owing to their ability to release growth factors and ultimately promote wound healing. Platelet-rich fibrin (PRF) is a second-generation platelet concentrate that does not require anticoagulants, thus permitting physiologic coagulation and avoiding interference with platelet-mediated angiogenic and fibrinogenic responses. In addition, the natural fibrin clot formation in PRF techniques allows for more effective platelet entrapment and extended release of growth factors over time. Hard tissue and soft tissue augmentation before or simultaneous with implant placement is one of the better-known applications of PRF in implant dentistry.

Methods

This case series reports on five patients who required tooth replacement with implant in the anterior maxilla and had less than 1mm of remaining buccal bone width. The five patients underwent extraction and immediate implant placement with simultaneous hard and/or soft tissue augmentation using PRF. Pre-operative and post-operative CBCT scans were compared, and UCLA Aesthetic Analysis was utilized on clinical photographs to assess changes during the treatment and follow ups post-surgery.



CASE #1



CASE #2

Surgical Procedure

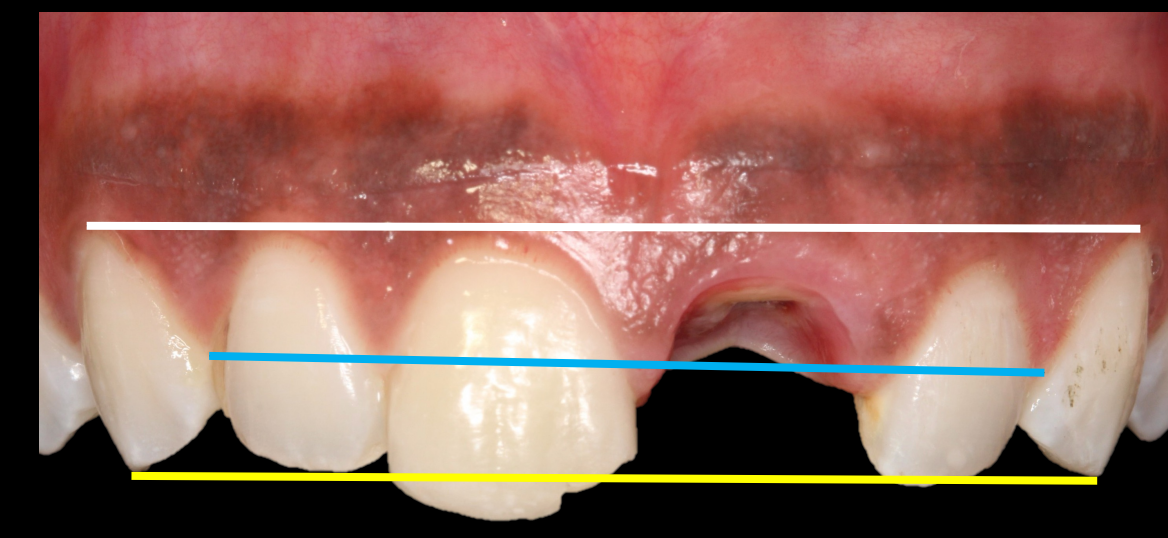


Fig 1a. UCLA Aesthetic Analysis



Fig 1b. Pre-op occlusal view

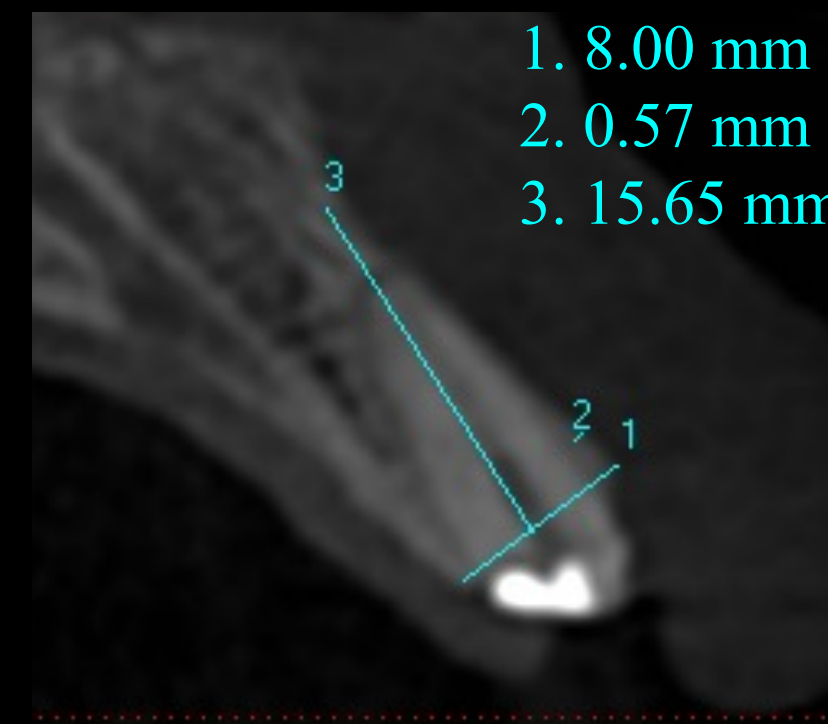


Fig 1c. Pre-op CBCT

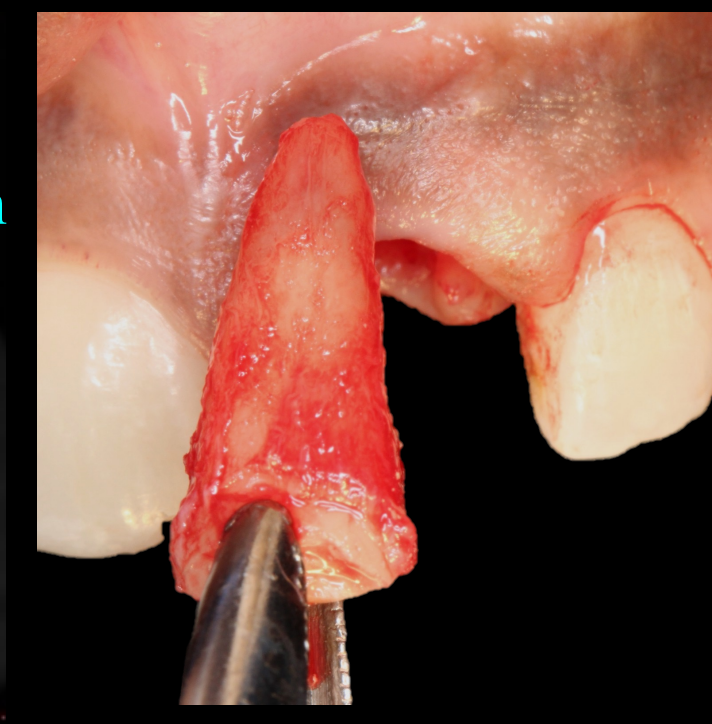


Fig 1d. Atraumatic extraction of tooth #9



Fig 1e. Intact socket

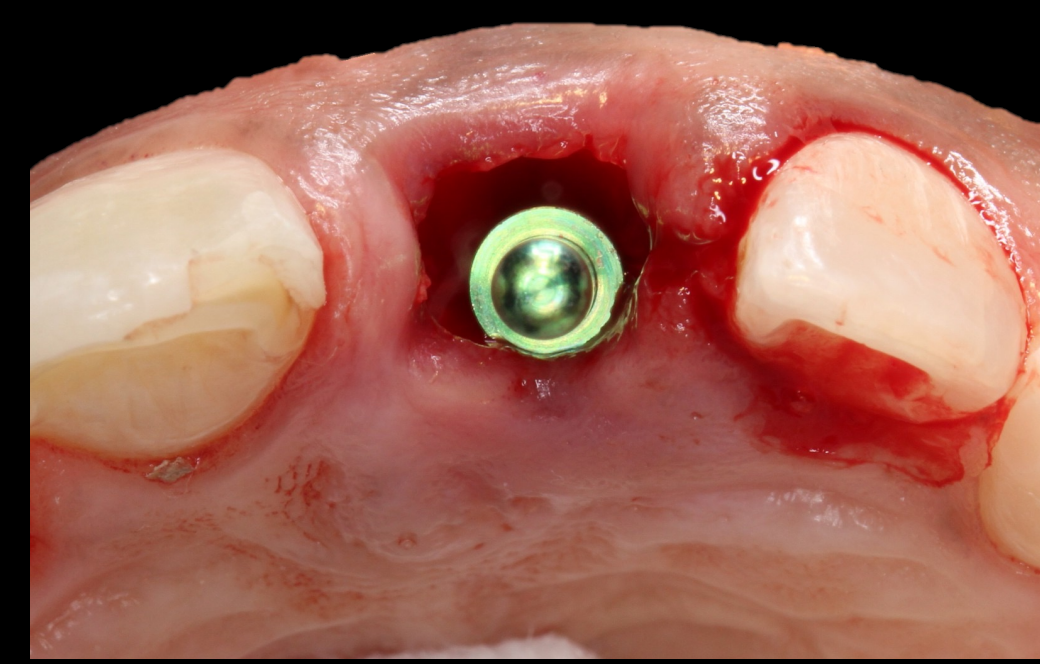


Fig 1f. Osteotomy was prepared towards palatal

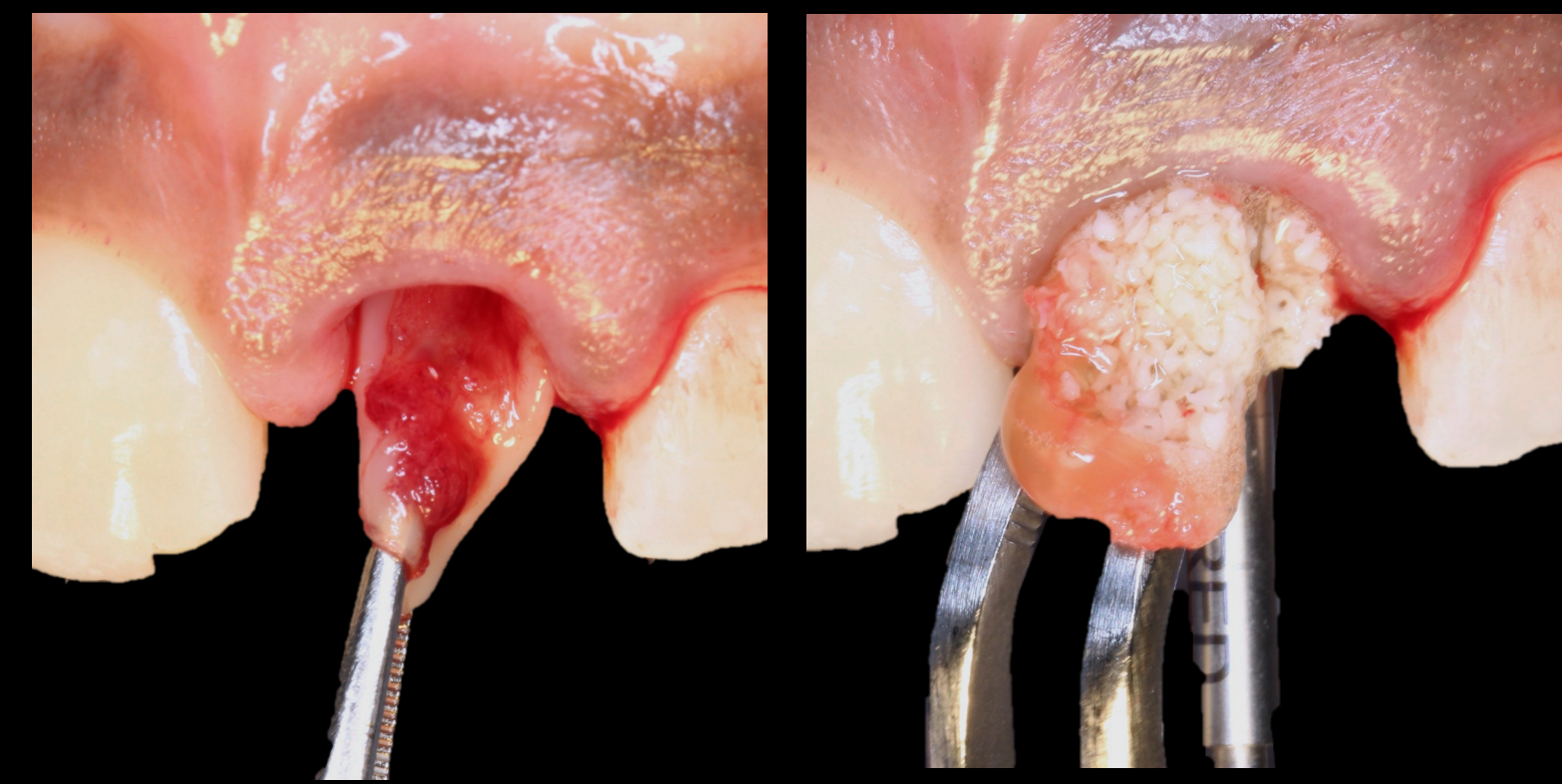


Fig 1g-i. PRF membrane was placed and socket augmented around last drill using sticky bone



Fig 1j. Implant was placed

PEN
61
68
61
68

Fig 1k. ISQ measurements



Fig 1l-n. Provisionalization using temp shell



Fig 1o. PRF membrane placed in cervical margin

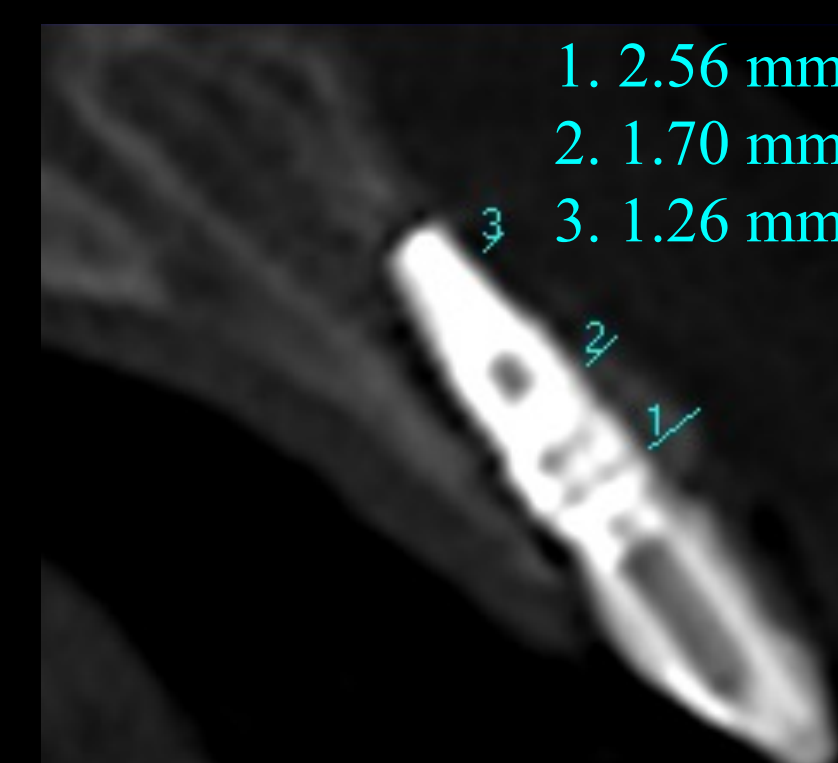


Fig 1p. Immediate post op CBCT

1 Week follow up



Fig 1q,r. 1 week post op follow up



Surgical Procedure



Fig 2a. UCLA Aesthetic Analysis

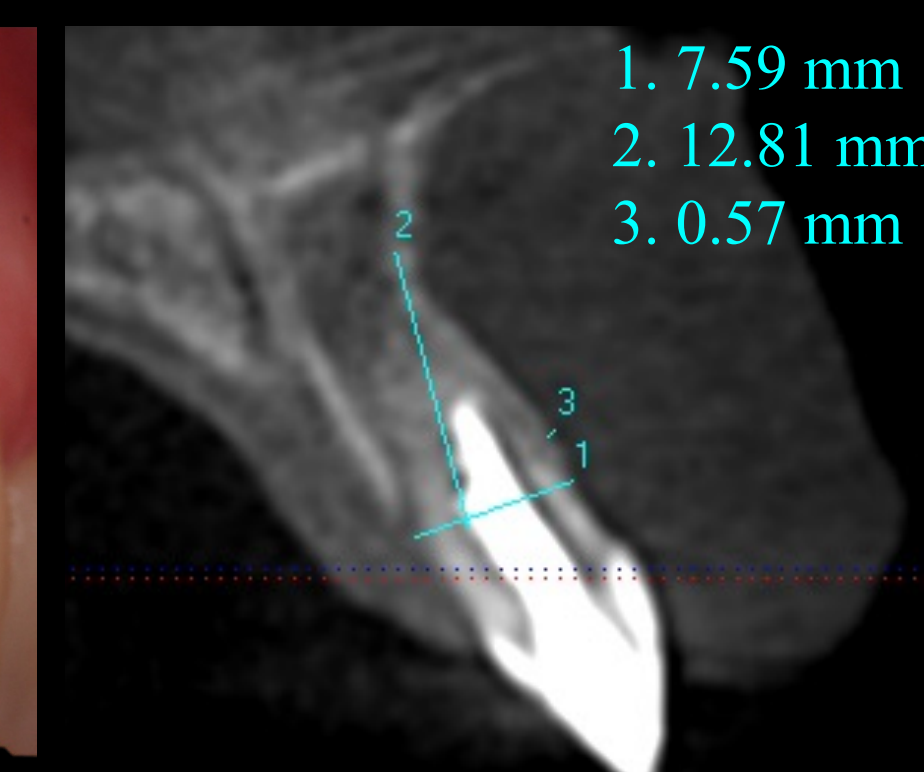


Fig 2b. Pre-op CBCT



Fig 2c. Osteotomy was prepared towards palatal

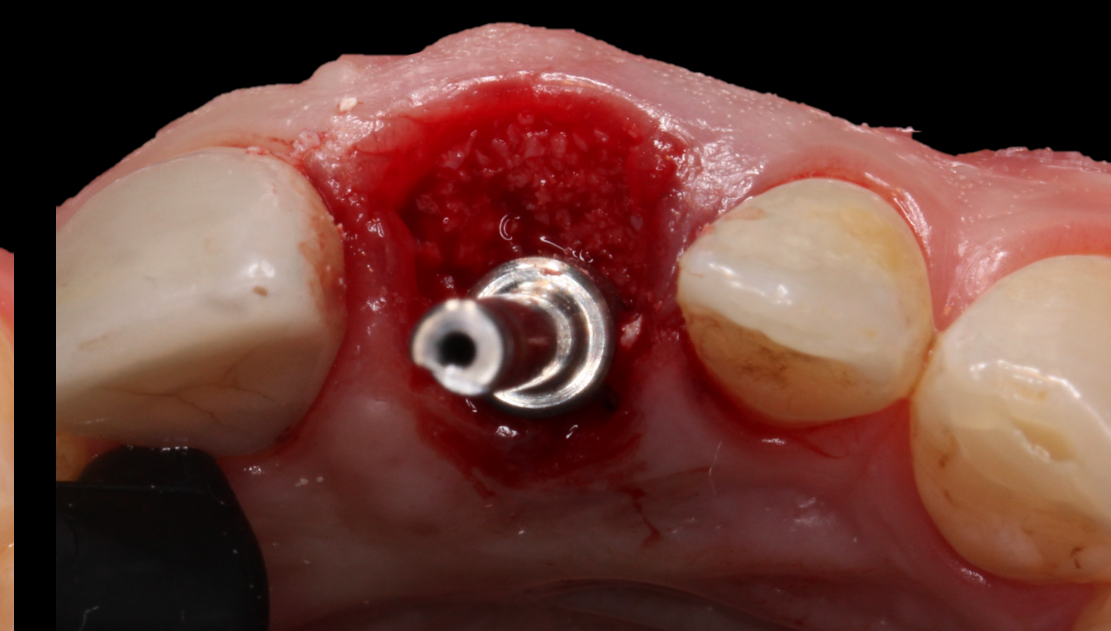


Fig 2d. Socket augmented around last drill using sticky bone

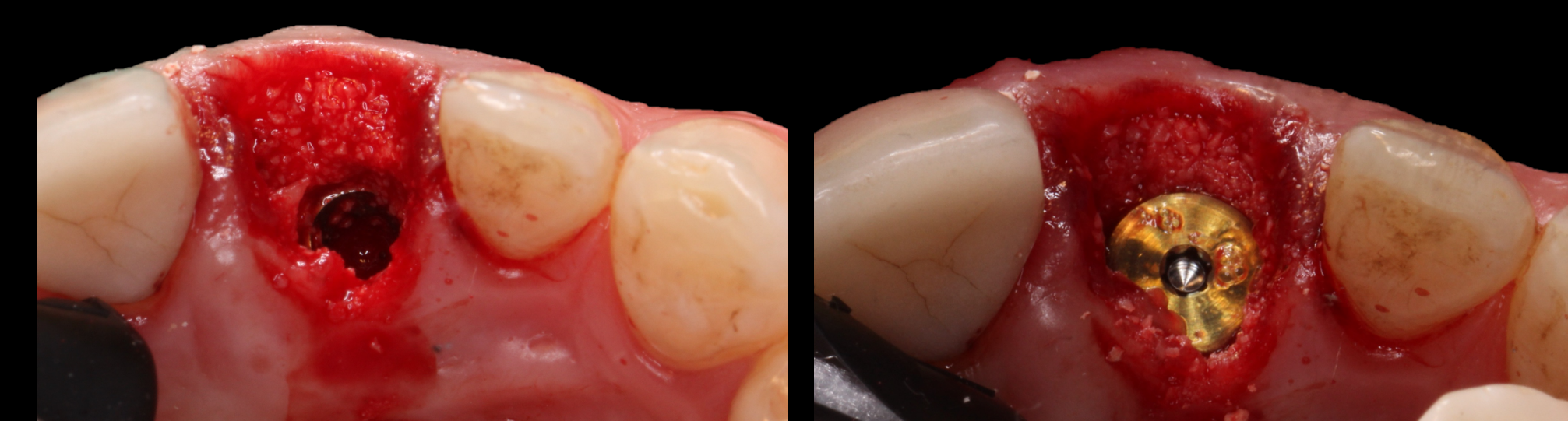


Fig 2e,f. Implant was placed and covered with THA

PEN	OSS
76	75
76	75
77	74
76	75

Fig 2g. ISQ measurements

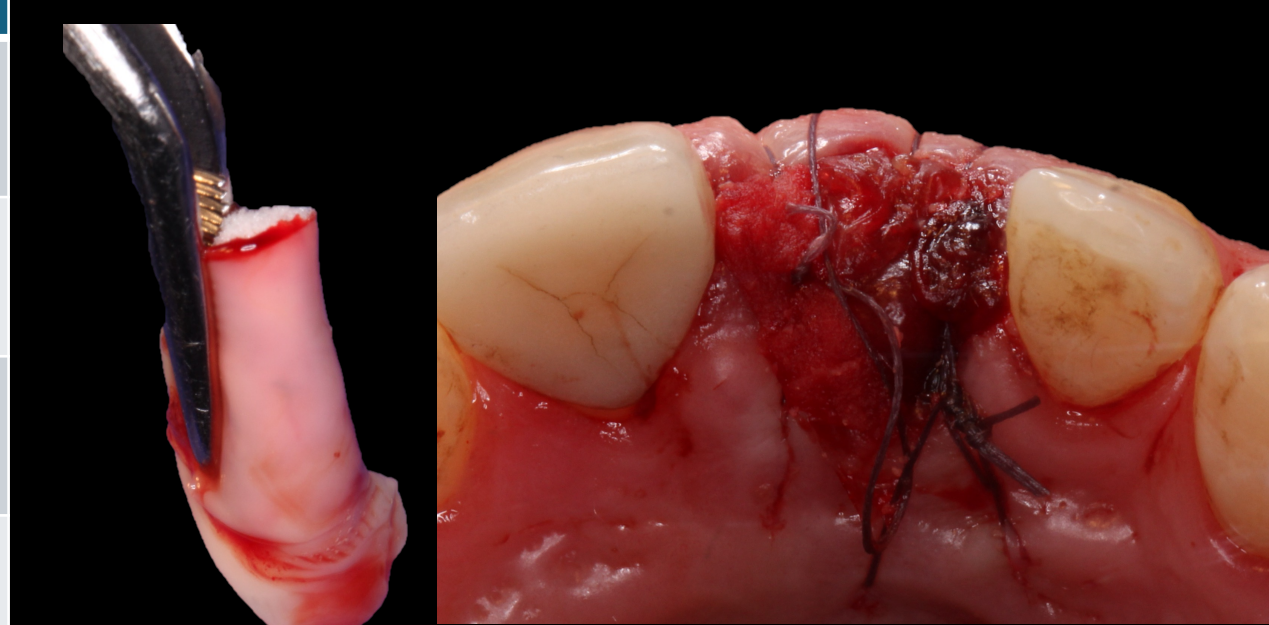


Fig 2h-j. Site covered with Gelfoam and PRF membrane, and closure obtained using figure of 8 and continuous running lock sutures

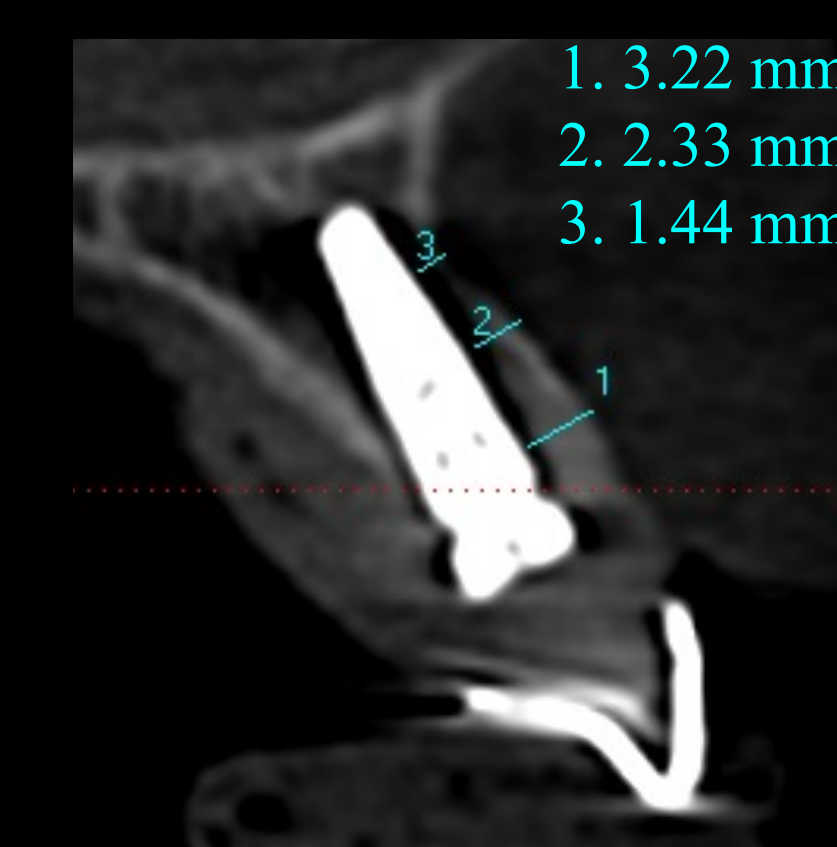


Fig 2k. Immediate post op CBCT

1 Week follow up



Fig 2l. Removable temporary prosthesis



Fig 2m,n. 1 week post op follow up



2.5 months follow up



Fig 2o,p. 2.5 months post op follow up

PEN	OSS
81	78
82	78
80	78
81	78

Fig 2q. ISQ measurements

5 months follow up

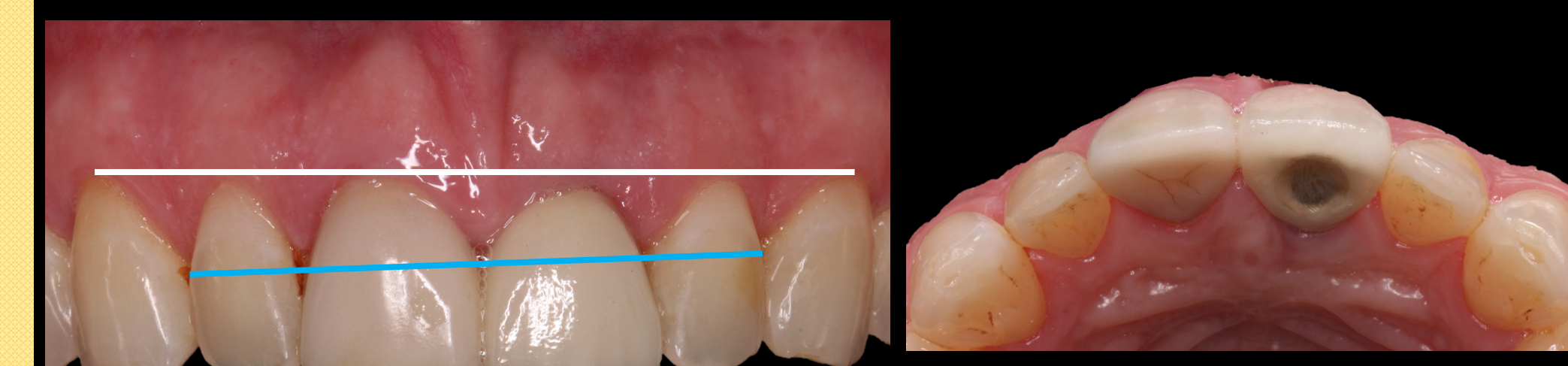


Fig 2r,s. 5 months post op follow up with definitive restoration



CASE #3

CASE #4



Surgical Procedure



Fig 3a. Frontal view

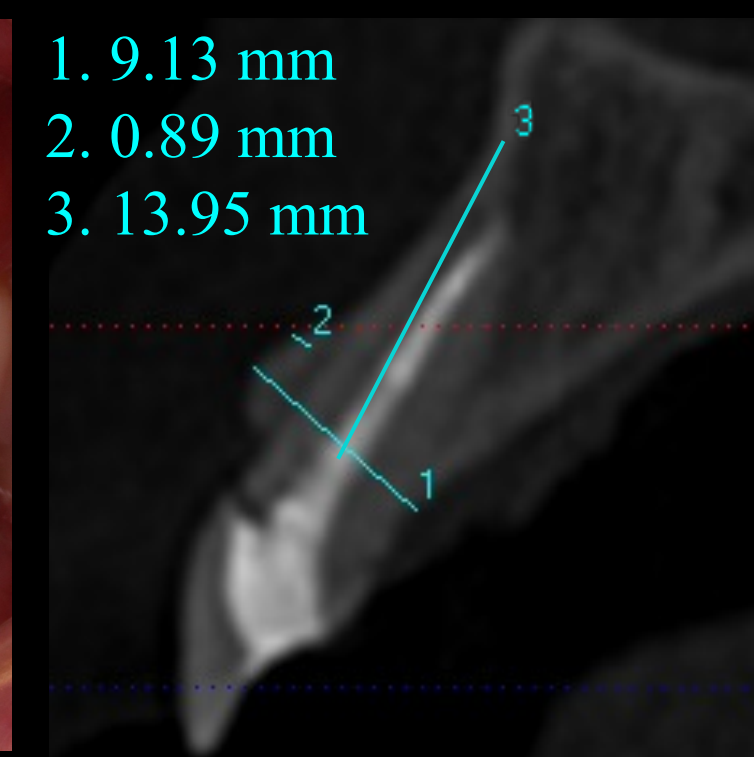


Fig 3b. Pre-op CBCT



Fig 3c. UCLA Aesthetic Analysis



Fig 3d. Atraumatic extraction of tooth #7



Fig 3e. Osteotomy was prepared towards palatal

Surgical Procedure

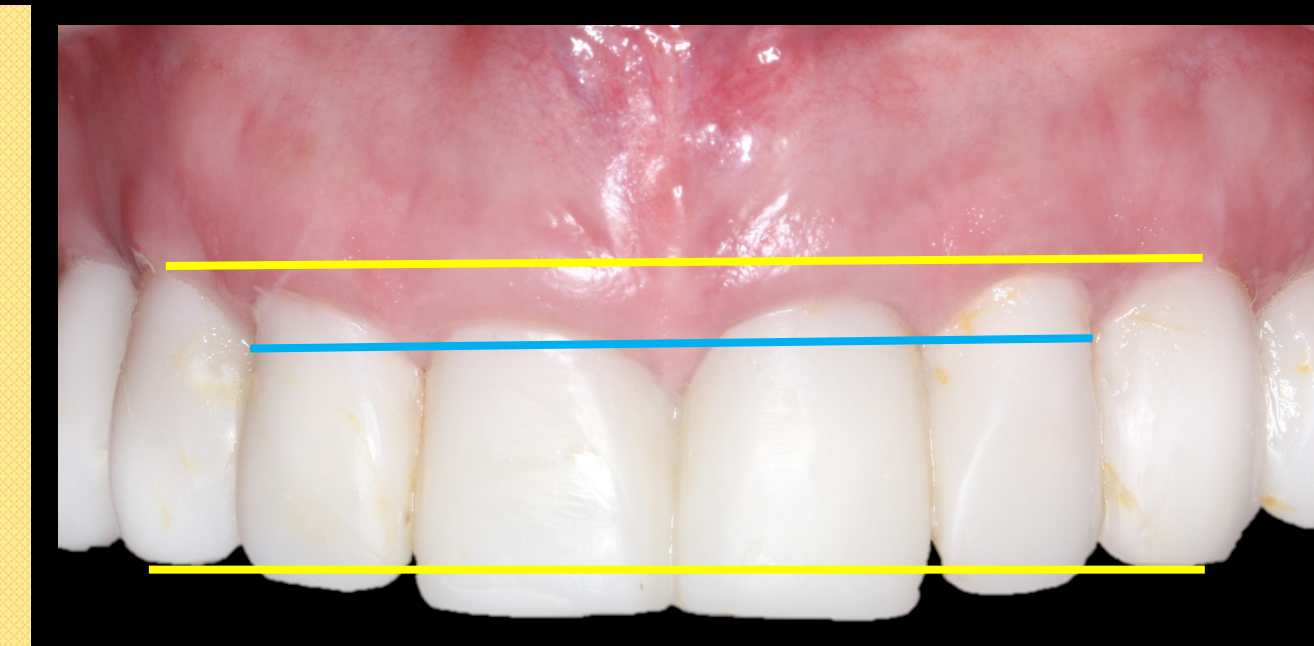


Fig 4a. UCLA Aesthetic Analysis



Fig 4b. Pre-op occlusal view

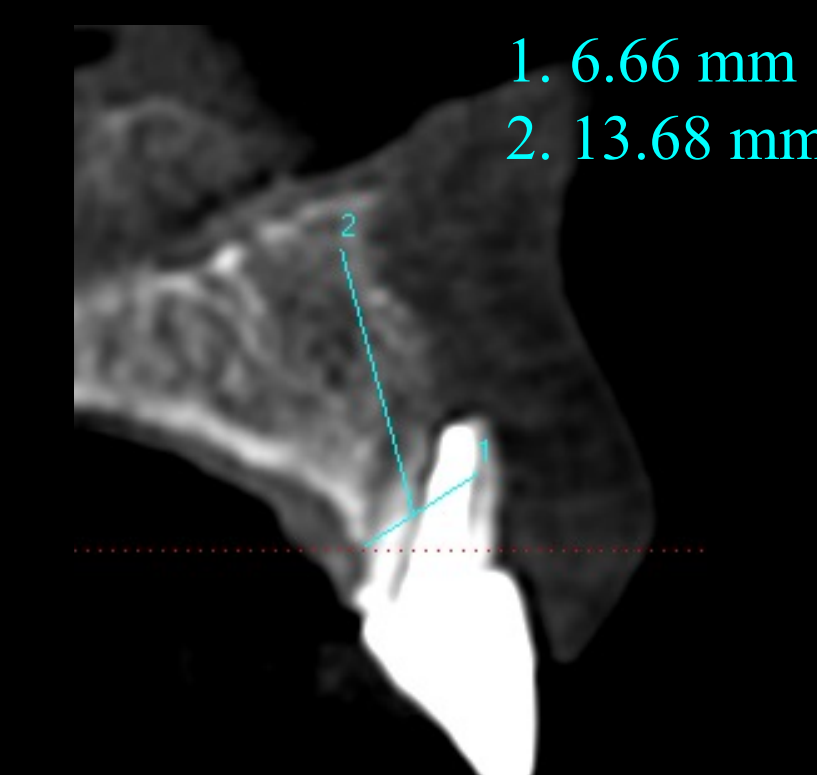


Fig 4c. Pre-op CBCT



Fig 4d. Atraumatic extraction of tooth #9



Fig 4e. Buccal bone dehiscence

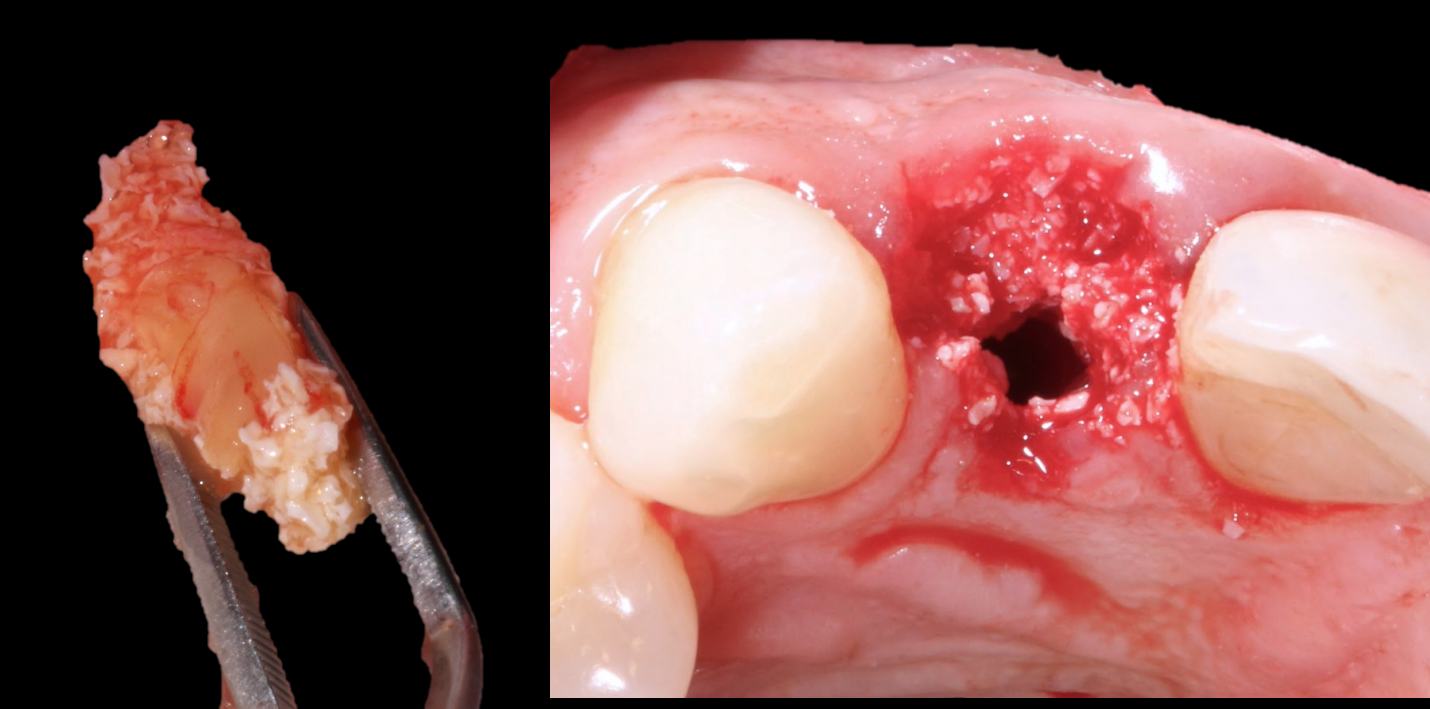


Fig 3f,g. Socket augmented around last drill using sticky bone and PRF membrane

PEN	OSS
52	62
52	62
59	51
59	51

Fig 3h. ISQ measurements



Fig 3i-k. Provisionalization using temp shell



Fig 3l. Gelfoam was placed

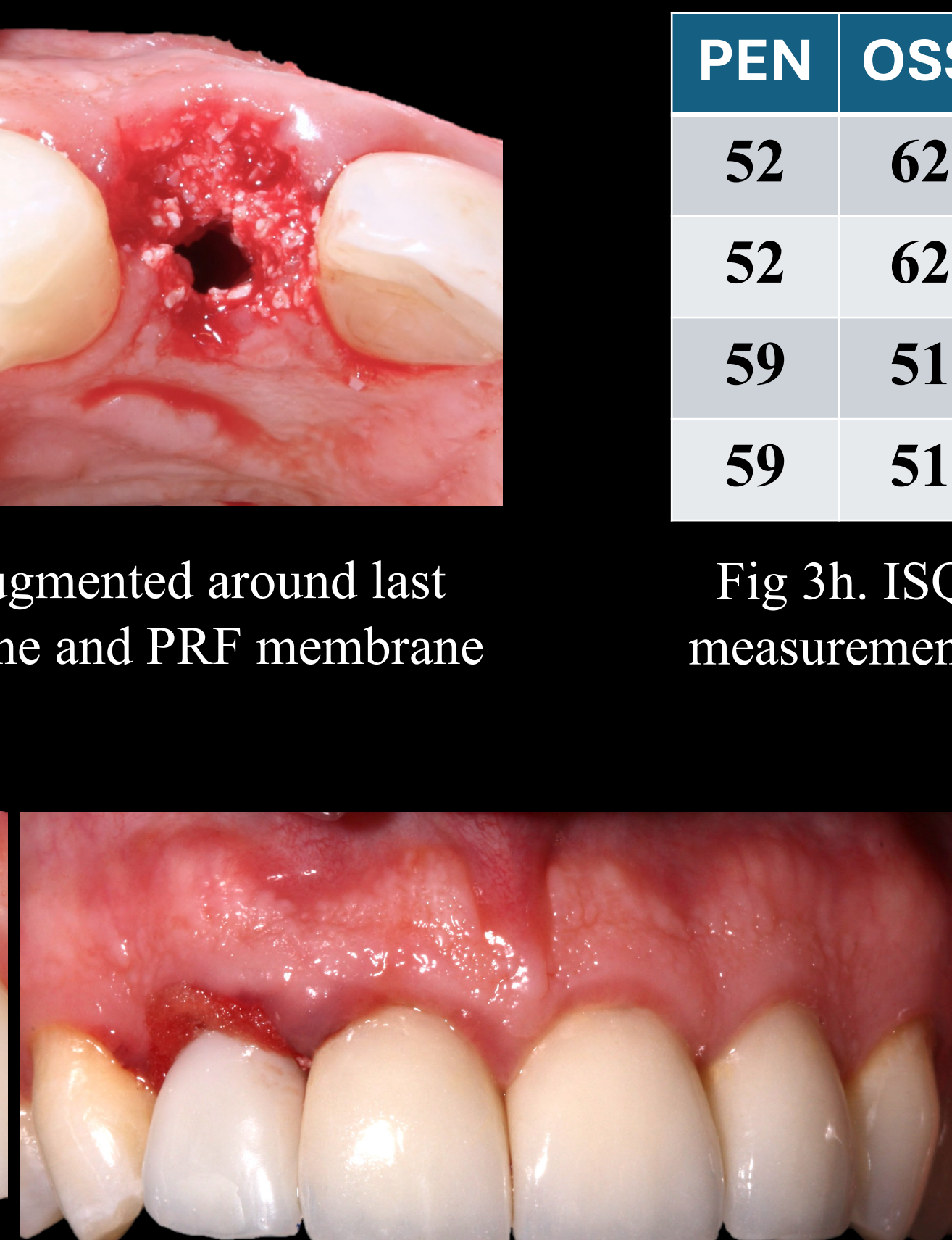


Fig 3m. Immediate post op frontal view

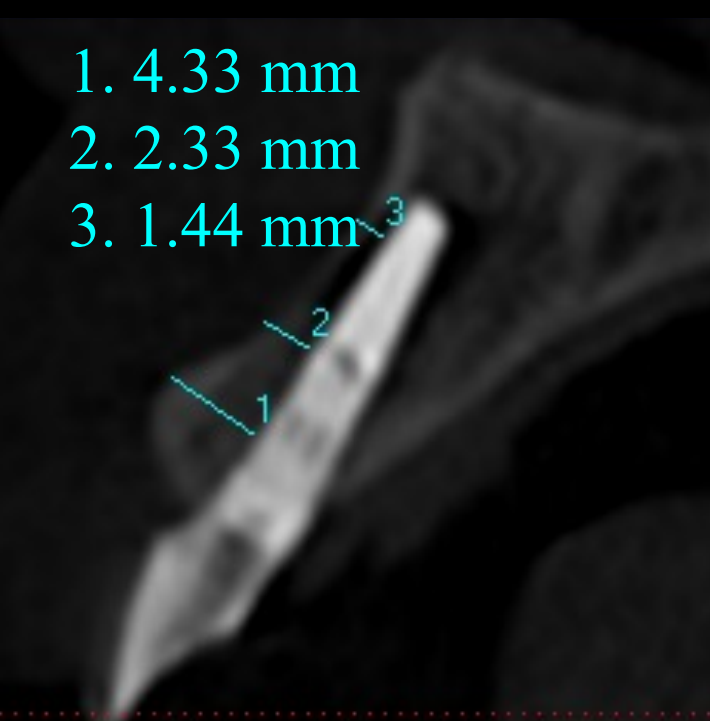


Fig 3n. Immediate post op CBCT

1 Week follow up



Fig 3o,p. 1 week post op follow up



Fig 3q,r. 5.5 months post op follow up with definitive restoration

PEN	OSS
62	64
64	64
62	64
65	66

Fig 3s. ISQ measurements

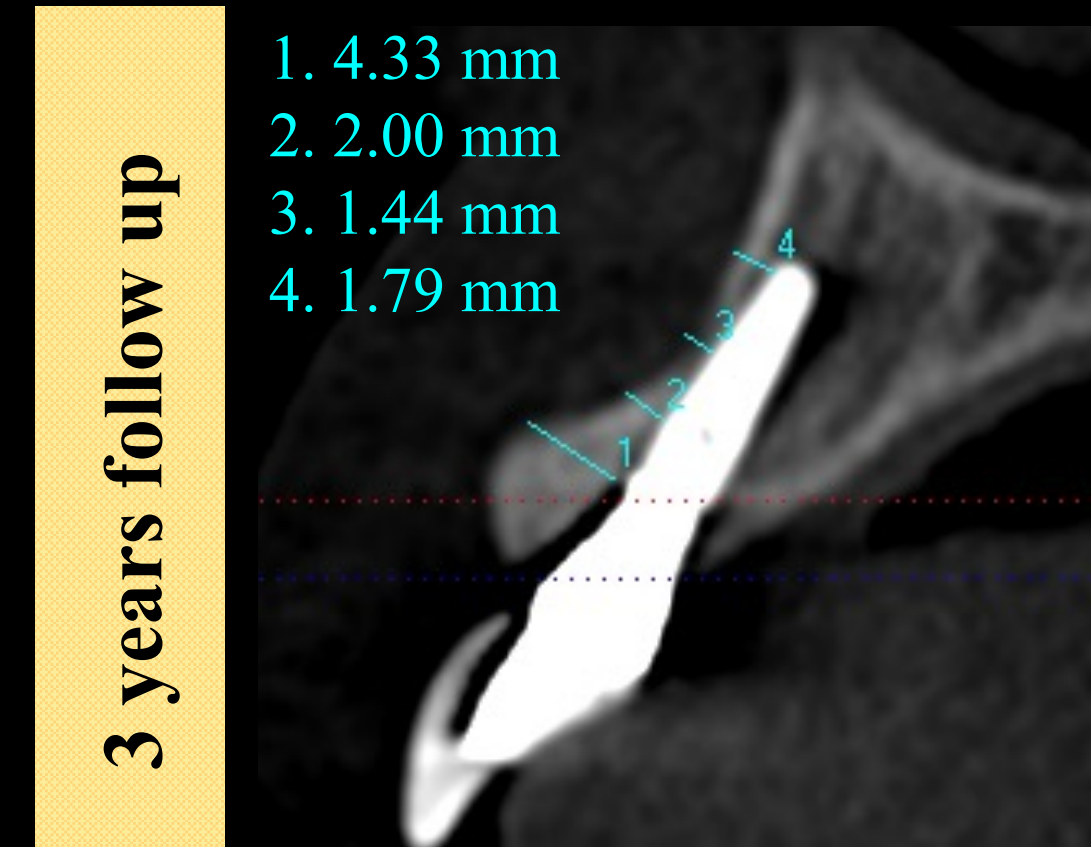


Fig 3t. 3 years post op CBCT

5.5 months follow up

3 years follow up

PEN
14
76
14
72

Fig 4i. ISQ measurements



Fig 4j,k. Provisionalization using temp shell



Fig 4l,m. Provisional try-in

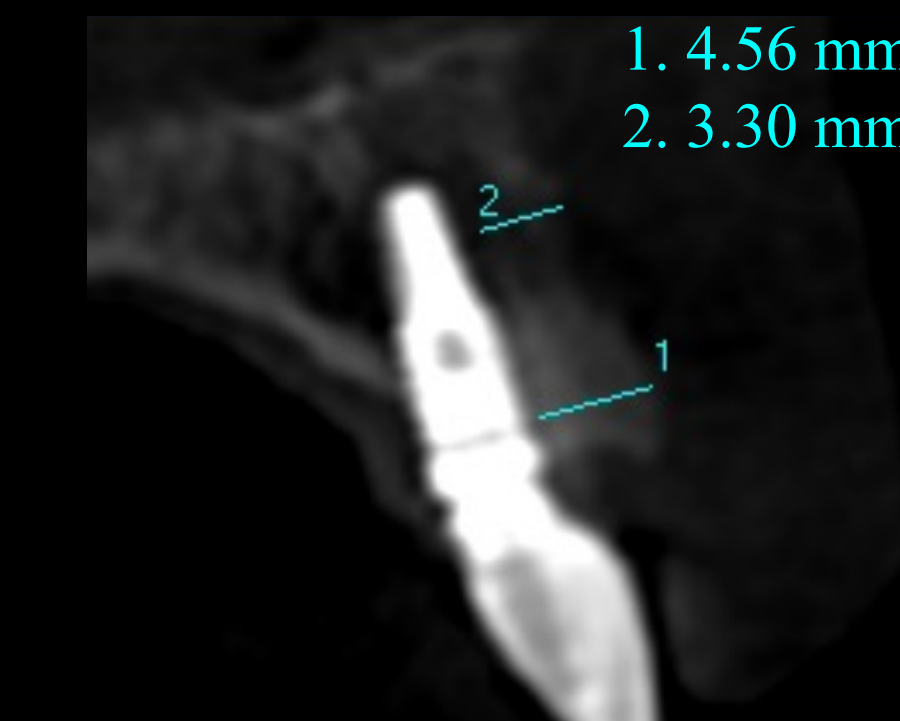


Fig 4n. Immediate post op CBCT

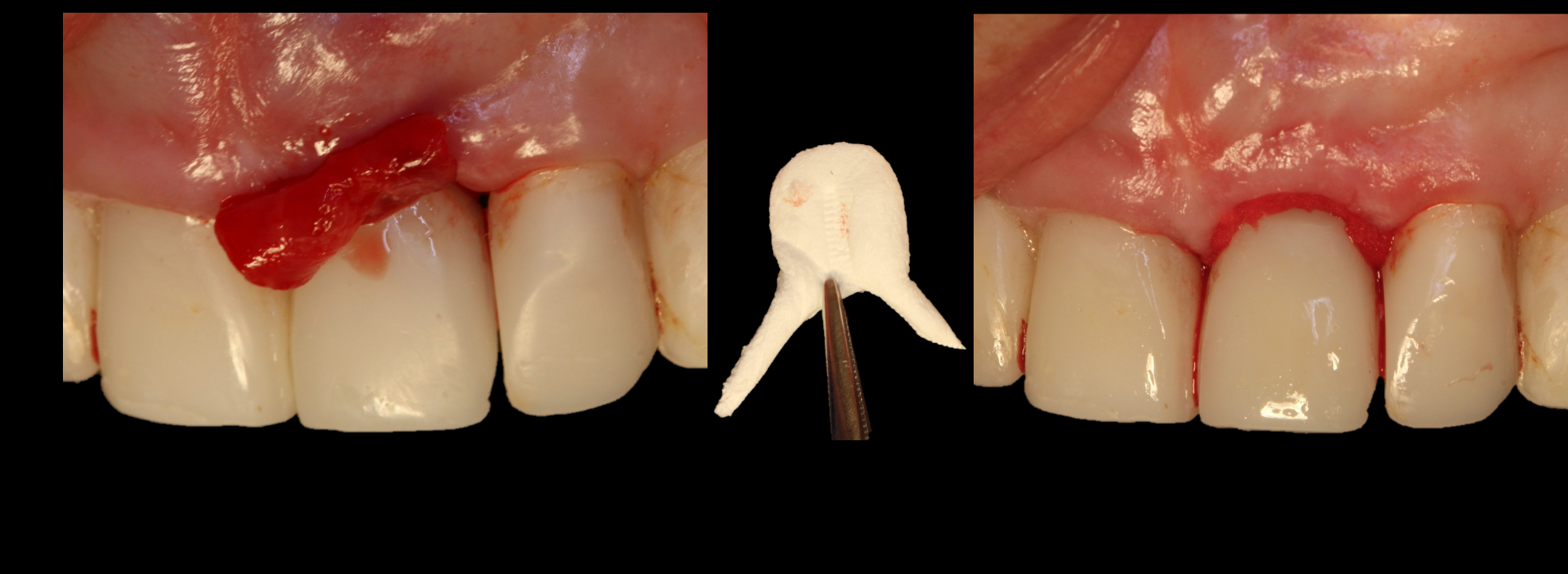


Fig 4o-q. Soft tissue was augmented using PRF membrane and Collaplug collagen matrix



Fig 4r,s. Closure was obtained using sling suture

5.5 months follow up

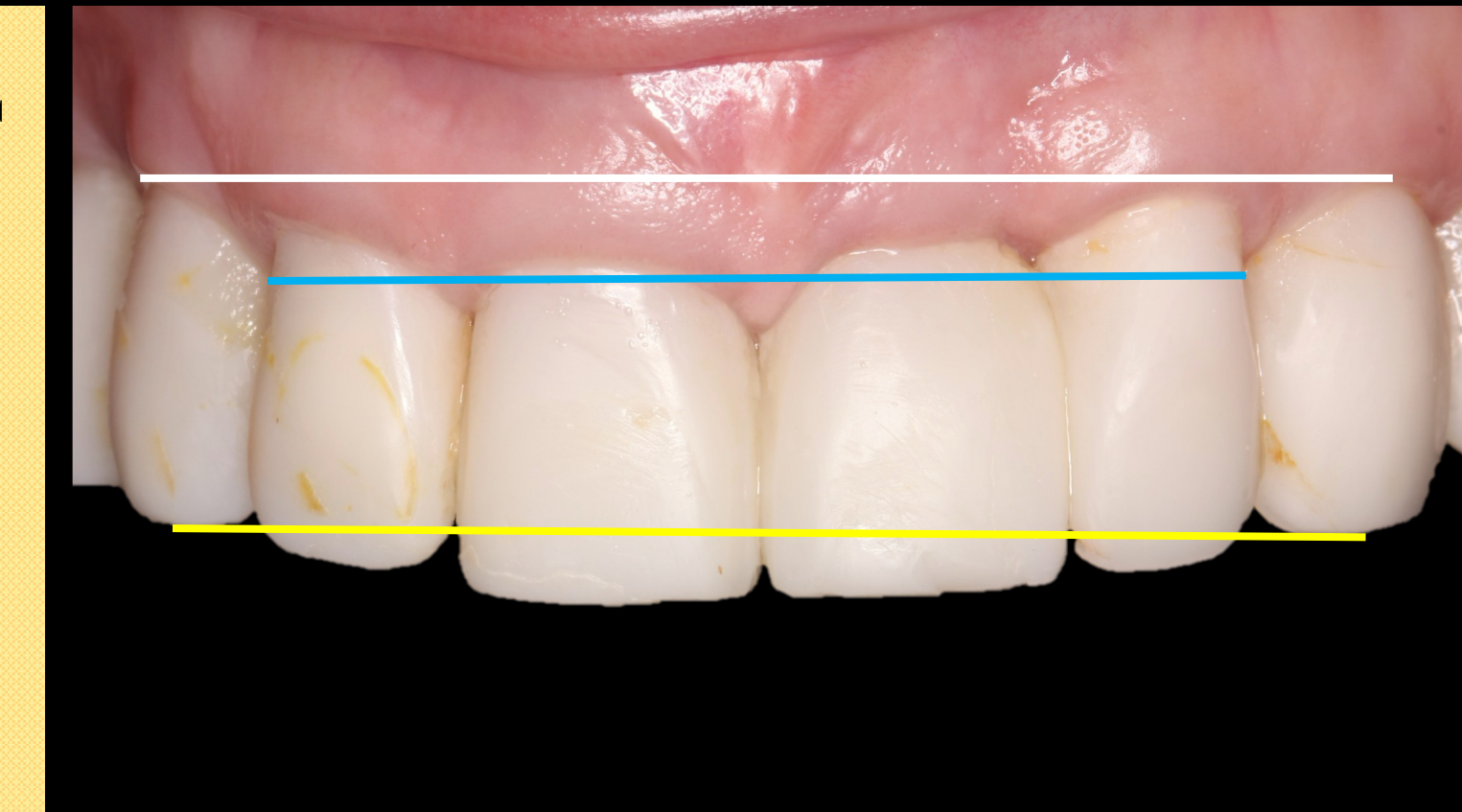


Fig 4t. 5.5 months post op follow up

PEN	OSS
60	71
81	73
59	73
80	73

Fig 4u. ISQ measurements

Surgical procedure

Fig 5a. UCLA Aesthetic Analysis

Fig 5b. Occlusal view

Fig 5c. Removal of temporary bridge

Fig 5d,e. Pre-op CBCT

Fig 5f,g. Full thickness tunneling dissection performed With three releasing incisions

Fig 5h. Teeth #7 & #10 were extracted

Fig 5i,j. Osteotomy was prepared towards palatal

Fig 5k,l. Sockets were augmented around last drill using sticky bone

Fig 5m,n. Implants were placed and covered with THA

Fig 5o-q. Augmentation through tunneling technique using sticky bone, PRF membrane, Fibro-Gide collagen matrix

#7		#10	
PEN	OSS	PEN	OSS
55	70	59	70
69	70	69	70
54	70	56	63
54	70	70	70

Fig 5r. ISQ measurement

Fig 5s,t. Immediate post-op frontal and occlusal view

Fig 5u,v. Immediate post op CBCT

1 week follow up

Fig 5w. 1 week post-op

3 weeks follow up

Fig 5x. 3 weeks post-op



Results:

Placement of implants in the proper position and angulation, along with the logical application of biomaterials, particularly PRF membrane, facilitated the successful management of challenging cases in the aesthetic zone. Clinical and radiographic evaluations revealed improvement in bone and especially soft tissue level. Maintaining the soft and hard tissue levels resulted in optimized aesthetics which is more critical in the anterior maxilla. It also allowed for immediate placement of an implant and even immediate loading with a provisional crown to enhance aesthetics, especially the emergence contours of the crown, and significantly reduces treatment time. Immediate post-operative scans showed an additional augmentation of 2.77 ± 0.97 mm in buccal bone width. Follow-up evaluations revealed sustained improvements in the long term as well.

Conclusion

Immediate implant placement is one of the more complex and challenging treatments in implant dentistry requiring meticulous management of the hard tissue, soft tissue, and proper implant positioning. The use of PRF, with its healing and stimulatory properties, holds the potential to enhance short-term and long-term outcomes with immediate implant placement. Further longitudinal studies with larger sample size are necessary to verify this result.

References:

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6. Del Fabbro, M., et al., Autologous platelet concentrates for treating periodontal infrabony defects. Cochrane Database Syst Rev, 2018. 11(11): p. Cd011423.