Partial Extraction Therapy(PET) Kit

Socket shield Technique
Pontic shield Technique
Vital Root Submergence Technique

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Partial ExtractionTherapy(PET) Kit

Dr. Howard Gluckman

- Completed dental training at the university of Witwatersrand in Johannesburg in 1990
- Completed a 4-year full time degree in Oral Medicine and Periodontics at the University of Stellenbosch in Cape Town
- Post graduate diploma in Implantology at both the University of Stellenbosch & University of Western Cape
- Director of the Implant and Aesthetic Academy in South Africa.
- Author of a monthly Implantology corner for the South African Dental Journal
- Immediate past president of the South African Society for dental Implantology
- Board of the Southern African Association of Osseointegration (SAAO)
- Experts panel of Dental XP and on the Dental XP scientific board.

The Partial Extraction Kit has been developed specifically to make the Partial extraction therapy techniques more achievable. The step by step process helps to standardize the procedure to enable faster and more predictable results. The development of the kit was made possible through research which highlighted the complications associated with the techniques. The internal and external shield exposure are the main complications associated with socket shield and Pontic shield. The use for the PET kit has specific drills that enable the simple reduction of the shield without damage to the adjacent mucosa as well as preparation of the chamfer below the bone level in order to create the prosthetic space necessary for ideal soft tissue healing over the shield.

The large round diamonds are ideal for both socket shield as well as root submergence technique. The size of the round drills allows fast and easy reduction of the roots to the ideal position reducing treatment times and achieving predictability.

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Partial Extraction Therapies (PET) Part 2:
Procedures and Technical Aspects

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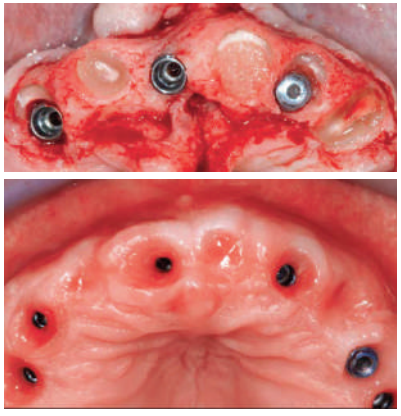


Successful implant therapy as we know it today is not merely a pursuit of osseointegration, but a full integration of healthy and esthetic peri-implant tissues framing the pro- sthesis.[1]

Akin to ensuring healthy periodontium around a tooth, establishing healthy peri-implant tissues is of paramount importance. The health, stability, and volume of bone has been the focus of the implant-restorative treatment dilemma for some time, yet the entire peri-implant tissue complex requires careful mana- gement.[2]

Healthy bone maintained at the coronal implant supports the establishment of the biologic width, namely connective tissue and the long junctional epithelium.[3]

With tooth loss, however, these tissues recede apically, as is evident at immediate implant placement.[4]

An understanding of the periodontium and this loss of tissues postextraction alludes to the underlying process—removal of the tooth severs the rich periodontal ligament (PDL) vasculature that supplies the alveolus bundle bone.[5]

Subsequently, resorption of the postextraction socket is inevitable. At an immediately placed implant site, the resorption may have significant esthetic and functional failure if the supporting tissues recede and when exacerbated by risk factors for recession.[6]

To address this, the partial extraction therapies (PET) proposethe partial retention of the tooth root to maintain the periodontium buccal/labial to it.[7]

The hypothesis has been that retention of the tooth root or part of it retains the PDL fibers that anchor it to the alveolus and preserve the PDL vasculature that supply the bundle bone, thus preserving all tissue components of the periodontium. Chronologically, root submergence introduced in 1953 proposed retaining decoronated tooth roots beneath full removable dentures to maintain the alveolar ridge. In 2007, the concept evolved to be applied at pontic sites beneath fixed partial dentures.[8] The socket-shield technique progressed from there, and healed tissue histology has been demonstrated following sectioning of a submerged root at immediate implant placement—the labial root section remaining in situ and supporting the periodontal tissues.[9]

In 2015, the socket-shield technique's partial root submergence was combined with socket grafting to preserve the ridge at pontic site development—viz the pontic shield.[10] These PET collectively encompass the root- and ridge-preservation techniques as applied in implant and restorative dentistry. They collectively use the tooth itself to offset the loss of ridge tissues by retaining the attachment to the periodontium with its vascular supply, preserving the tooth-PDL-bundle bone complex, and thus challenge the conventional extract and augment approach.[7]

The authors propose that strategically saving part of the tooth is the ultimate preservation technique for retaining soft tissue esthetics at implant and pontic sites. However, it is pertinent that rigorous testing be applied to newer techniques that long-term data be used to scrutinize.[11]

This would not be possible if there were vast heterogeneity in the application of PETs with no congruency as to how the treatments are applied and thus no data to accurately inspect. Therefore, step-by-step instructions for these techniques are provided here (Table1).

The aim of this work is to facilitate carrying out and reporting on these techniques and accumulation of significant clinical and research data to allow the techniques to be scrutinized for validity, or lack thereof, in restorative and implant dentistry. The term buccal denotes the cheek and may be used incorrectly in the literature. For clarification, buccal in this report will refer to outer aspects of the teeth and ridge apposed to the vestibule up to the mesial edge of the first premolar, and labial or facial will refer to the outer aspects of the ridge and teeth apposed to the vestibule of the anterior teeth, distal canine to distal contralateral canine. While the technique may be possible in mandibular anterior tooth sites, for the sake of descriptive purposes the anterior maxilla will be referred to throughout this review.

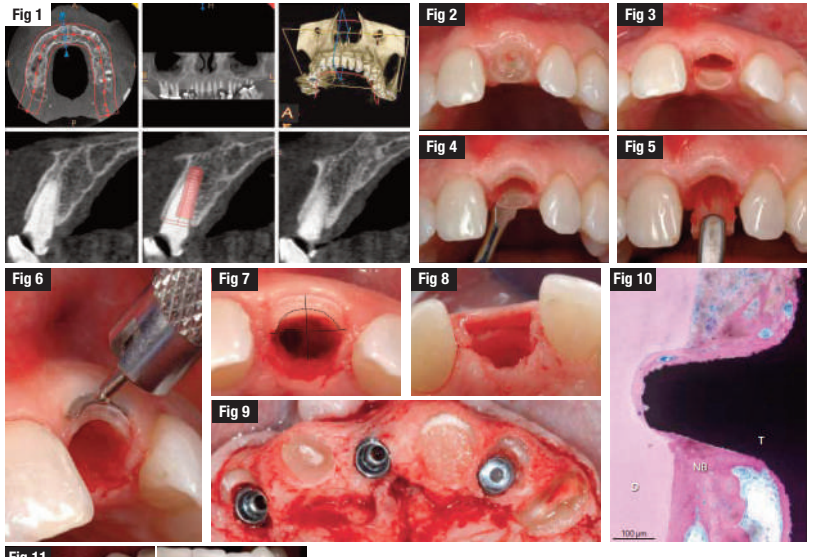


Table 1 Instruments and Materials Required for PET

Socket-shield
1. Long shank root resection bur
2. Extra-large round diamond head bur (to reduce inner aspect of shield into concavity)
3. End-cutting diamond head bur (to reduce coronal aspect of shield)
4. Gingival protector
5. Irrigated surgical motor
6. Contra-angled surgical fast handpiece
7. Microperiotomes
8. Microforceps
Pontic shield
As for socket-shield, plus:
1. Socket grafting instruments: plugger, particulate graft spoon, crucible
2. SM 69 blade (or other suitable microblade, mandatory for split thickness dissection of facial and palatal pouches to tuck CTG into)
3. 6/0 nylon sutures
Root submergence
1. Irrigated surgical motor
2. Contra-angled surgical fast handpiece
3. Extra-large round diamond head bur (for reducing coronal aspect root into concavity)
4. SM 69 blade (or other suitable microblade, mandatory for split thickness dissection of facial and palatal pouches to tuck CTG into)
5. 6/0 nylon sutures

Fig 1 Cone beam computed tomography planning in the maxilla; the clinician can note any pathology of the root, root's dimensions, and orientation within the ridge.

Fig 2 Decoronation of the maxillary left central incisor without damage to the soft tissue.

Fig 3 Mesiodistal sectioning of the tooth root.

Fig 4 Elevation of the palatal root section by microperiotome.

Fig 5 Delivery of the palatal root section by microforceps.

Fig 6 Final reduction of the socket-shield with the gingival protector in position.

Fig 7 The socket-shield reduced about midway from the root canal to the root's surface.
Note the prepared osteotomy palatal to the socket-shield.

Fig 8 The final socket-shield, reduced 1 mm above the bone crest, without damage to the overlying gingiva.

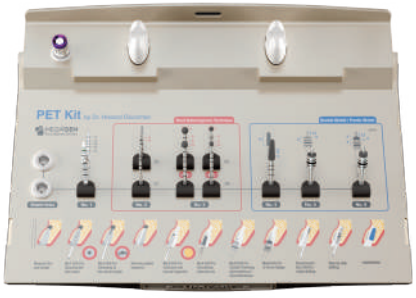
Fig 9 Multiple PET carried out in the same patient. The site of the maxillary left central incisor is prepared as a pontic shield and the socket grafted with xenograft particulate bone. Note the socket-shield at the site of the left lateral incisor allows for grafting of the buccal gap, while the site of the right canine does not.

Fig 10 New bone (NB) interposed between implant thread (T) and dentin of socketshield (D) (100 µm). Image reprinted by permission of Wiley Periodicals.

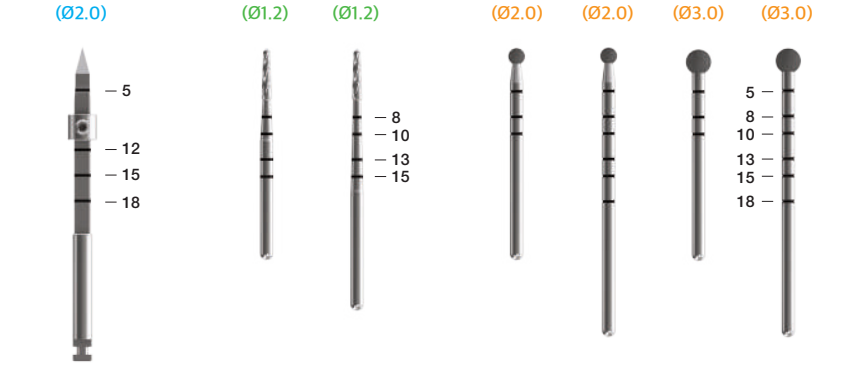
Fig 11 (a) Overextended socket-shield resulted in perforation that when reduced (b) allowed for healing and closure of the soft tissues.

Partial Extraction Therapy(PET) Kit
Components

Maximum Speed (RPM) of Drill			
R1	1,200	LD2037 FS40G	GD40G FD3010B
R2	40,000	LMD1225	LMD1231
R3	100,000	RD2025B RD3025K	RD2034B RD3034K



Ref.C PET 3000



LD2037 — Lance Drill

LMD1225 LMD1231 — Lindermann Drill

RD2031B RD2025B RD3025K RD3034K — Round Diamond

Diamond Drill (Lance Drill)

RPM	Diameter	Length(mm)	Ref.C
R1	Ø2.0	37	LD2037

* Depth stopper adjustment is possible with Hand Driver 0.9 Hex.

Diamond Drill (Lindermann Drill)

RPM	Diameter	Length(mm)	Ref.C
R2	Ø1.2	25	LMD1225
R2	Ø1.2	31	LMD1231

Diamond Drill (Round Diamond)

RPM	Diameter	Length(mm)	Ref.C
R3	Ø2.0	25	RD2025B
R3		34	RD2034B
R3	Ø3.0	25	RD3025K
R3		34	RD3034K

Diamond Drill (Final Shaper)

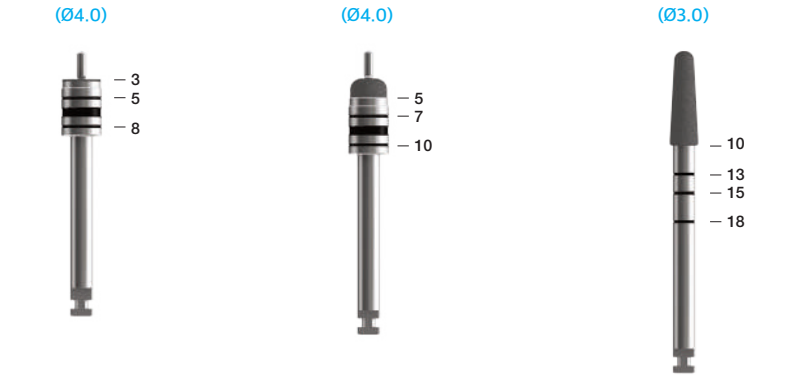
RPM	Diameter	Length(mm)	Ref.C
R1	Ø4.0	28	FS40G

Diamond Drill (Guided Drill)

RPM	Diameter	Length(mm)	Ref.C
R1	Ø4.0	30	GD40G

Diamond Drill (Finishing Diamond)

RPM	Diameter	Length(mm)	Ref.C
R1	Ø3.0	34	FD3010B



FS40G — Final Shaper

GD40G — Guided Drill

FD3010B — Finishing Diamond

How to use
Partial Extraction Therapy(PET) Kit

- Socket shield Technique
- Pontic shield Technique
- Vital Root Submergence Technique

Socket shield Technique

Cut the tooth flush with the gum, utilising the number 2 drill.

Set the length of the no 1 drill using the depth stop and tighten with the relevant driver. Drill with copious cooling and intermittent pump action drilling until you reach the level of the depth stop. Take an X-ray to confirm you have reached the apex of the root.

Use the long shanked no 2 drill to section the root from messiah to distal in a sweeping action that runs from medial line angle to distal line angle. Ensure that you have measured and marked the length of the root on the drill to make sure you don't drill passed the apex.

The palatial portion of the root is removed by placing pressure from the palatal side of the palatal portions. Your finger should rest on the buccal portion to ensure no movement of that portion. If it moves it means the palatal portion is not correctly reduced.

Once the palatal portion has been removed the apical portion needs to be dressed. The root apex and any gut Percha material is removed using the no 3 round drill. This drill is placed at the most apical portion, placed against the root and moved occlusal in a painting motion. The drill should not be pushed apically as this may lead to perforation of the buccal plate .

Socket shield Technique

With the apical area finished the number 3 round drill is used to reduce the coronal portion as close to the crest of the bone as possible. Make sure that the gingiva is retracted with a gingival retractor to prevent damage to the gum during drilling.

Final preparation of the coronal portion. The shield is placed at bone level. Use the CBCT or bone sounding to measure the depth of the bone. Use the marlins on the drill to get the shield to the correct depth

The final preparation of the internal section reshaping and smoothing off the internal section of the shield.

Implant Preparation according tot he normal protocols of anyridge or anyone implants.

After that,
it needs step-by-step drilling.

The implant should be placed about 0,5mm above the shoulder of the chamfer to allow maximum space between the implant and the shield, This will reduce the risk of internal shield exposure. The implant can touch the shield if there is minimal space however the larger the gap the better

Socket shield Technique

Either a provisional crown or a custom abutment with an emphasis on the distance between the shield and the abutment is crucial, We need 2-3mm of space to allow good soft tissue coverage of the shield. Failure to do this may lead to an internal shield exposure.

Pontic shield Technique

Measure the length of the root from the level of the gingiva to the apex. Cut the tooth flush with the gum.

Set the length of the no 1 drill using the depth stop and tighten with the relevant driver. Drill with copious cooling and intermittent pump action drilling until you reach the level of the depth stop. Take an X-ray to confirm you have reached the apex of the root.

Use the long shanked no 2 drill to section the root from messiah to distal in a sweeping action that runs from medial line angle to distal line angle. Ensure that you have measured and marked the length of the root on the drill to make sure you don't drill passed the apex.

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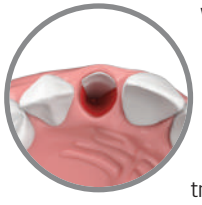

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The final preparation of the internal section reshaping and smoothing off the internal section of the shield.

Complete the procedure by performing a bone graft.

Perfect matching with **AnyRidge**

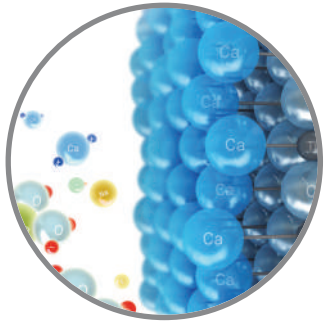
The strong point of Root membrane technique is Immediate Implant Placement. Strong initial stability guarantees a high success rate. AnyRidge Implant system of MegaGen and Root membrane technique are in harmony with strong initial stability and fast osseointegration.

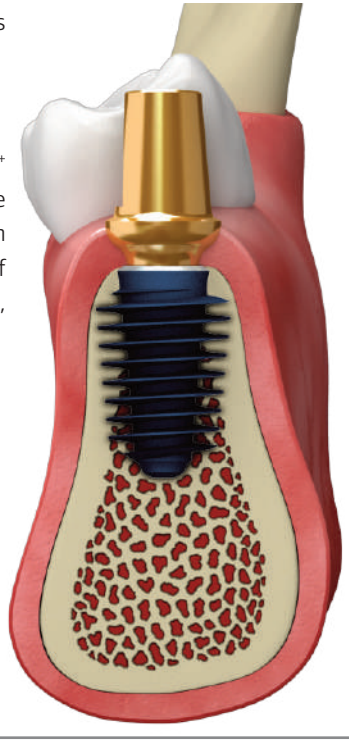
AnyRidge Knife Thread Design

Knife Thread® with an oblique shape is designed of round face and narrow thread. Therefore, it can obtain an optimal ISQ because it is placed without damaging the unique architecture of cancellous bone. Also, it gives even stress distribution.

AnyRidge Xpeed Surface Treatment

XPEED® surface treatment technology is that the Ca^{2+} ions which increase osseointegration rate on fixture surface can reached through the chemical reaction with 0.5 micrometer thickness. Also, there is no problem of absorption of the coating layer after scaling deterioration, BIC and Removal Torque values are excellent.





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