

Anterior implant site development using orthodontic extrusion

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Sound periodontal status is essentially necessary for esthetic implant treatment of anterior missing teeth region. However, we usually meet patients in our clinic with poor periodontal condition around missing teeth. To achieve esthetic final result in these poor bone and periodontal status, we can use bone graft, GBR (guided bone regeneration), distraction osteogenesis and orthodontic extrusion method. In these methods, if we use orthodontic extrusion, we can get increase soft tissue and even hard tissue volume according to the accompanying extrusion of periodontal attachment apparatus. This is minimal invasive and natural method for making bone and soft tissue. So, we will present clinical anterior implant restoration cases after anterior implant site development using orthodontic extrusion of the hopeless teeth which extraction was determined

Crown fracture case due to trauma

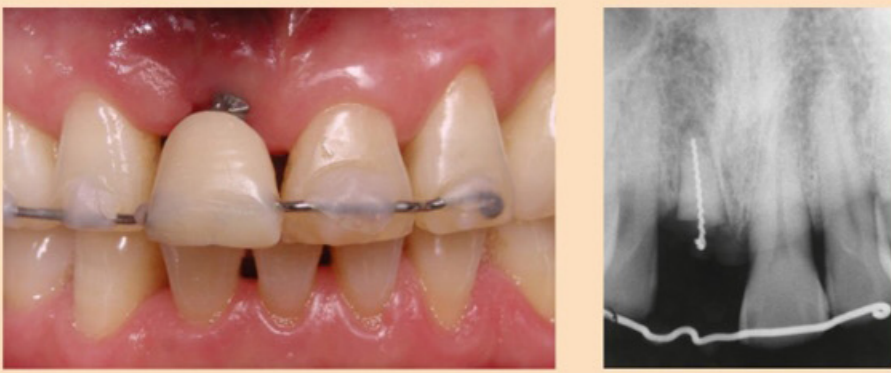


• K J W (37, M)

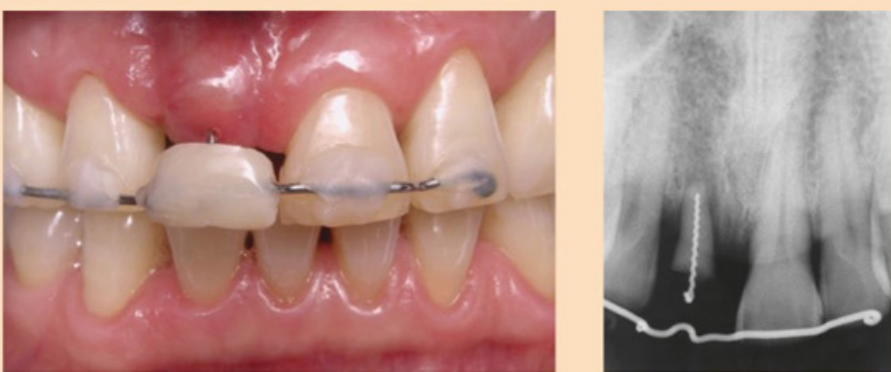
#11 crown was broken due to maxillofacial region trauma and the buccal bone plate of #11 teeth was almost lost status. Unesthetic final result was expected, if we extract the root and implant the fixture immediately. So we planned to implant the fixture after implant site development using orthodontic extrusion of the fractured root to regenerate the soft and hard tissue around #11.



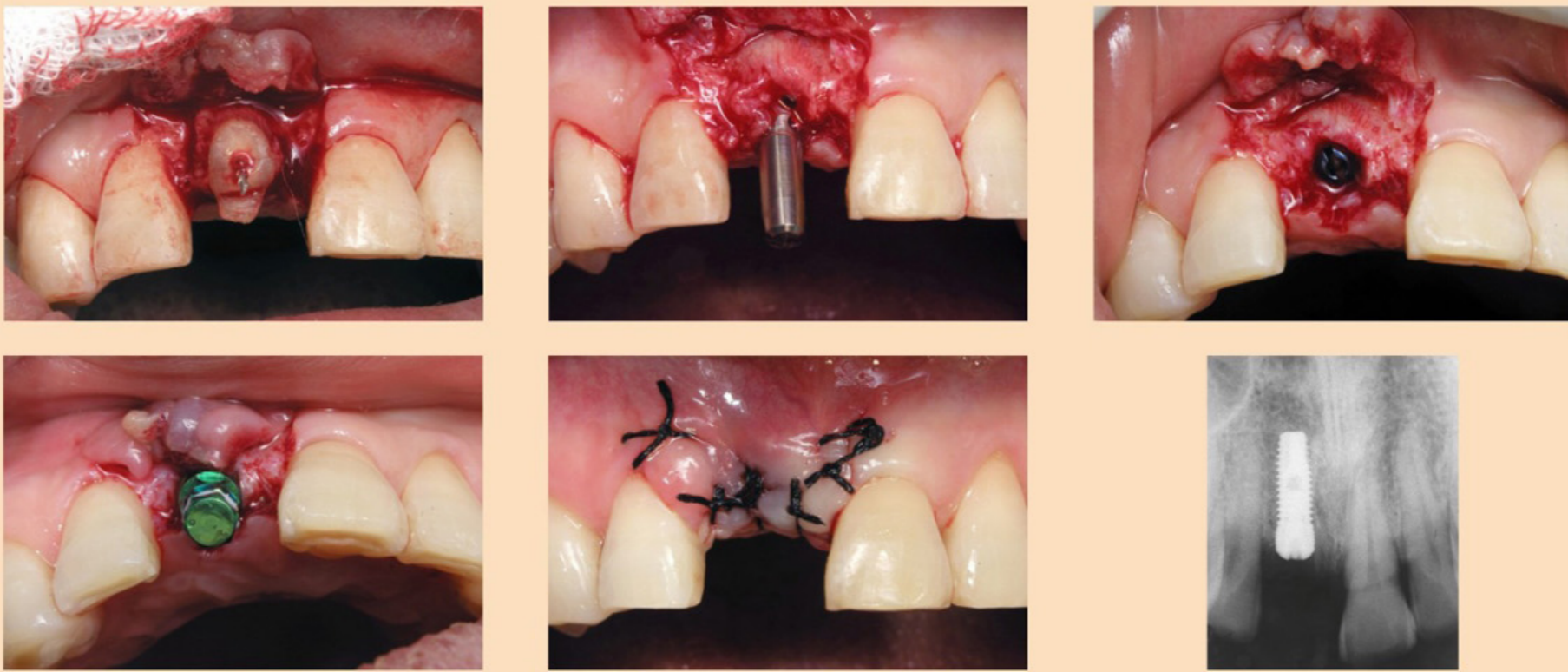
0.9mm SS wire was bended passively and bonded by orthodontic resin around adjacent teeth. Endodontic file was engaged into the broken root canal and connected it with the main arch wire using powerchain for extrusion. Orthodontic extrusion force vector was directed anteriorly and inferiorly to regenerate more soft and hard tissue.



2 months later after orthodontic extrusion, gingival volume was more increased than the initial visit ,according to the extrusion of the #11 root.



3 months later after orthodontic extrusion, we can see the regeneration of soft and hard tissue good to implant the fixture.



4 months later after orthodontic extrusion, removing the #11 root and 1st implantaion surgery was done simultaneously. We can see new bone formation according to the accompanying extrusion of periodontal attachment apparatus. 3.8mm diameter, 12mm length and SLA surface treated Implantium® (Dentium, Seoul, Korea) fixture was used. It was submerged. No bone graft and no soft tissue graft was done. 3 months later after 1st implant surgery, 2nd implant surgery was done and synthetic graft material (hydroxyapatite, Osteon® Dentium, Seoul, Korea) was grafted for perfect esthetic result.



Clinical photo and X-ray right after final prosthetic crown (PFG) delivery. We can see the immature soft tissue and somewhat unesthetic black triangle, but it was improved nicely when compared with the initial state. In other words, appropriate crown length and gingival line harmonious around the teeth was achieved.



3 years follow up clinical photo and X-ray after final prosthetic crown delivery . We can see the gingival creeping phenomenon and filling the embrasure space spontaneously and black triangle between #11 fixture and #21 is decreased. Marginal bone level around the fixture top is well maintained in the X-ray.

Severe gingival recession and bone loss case due to periodontal disease.

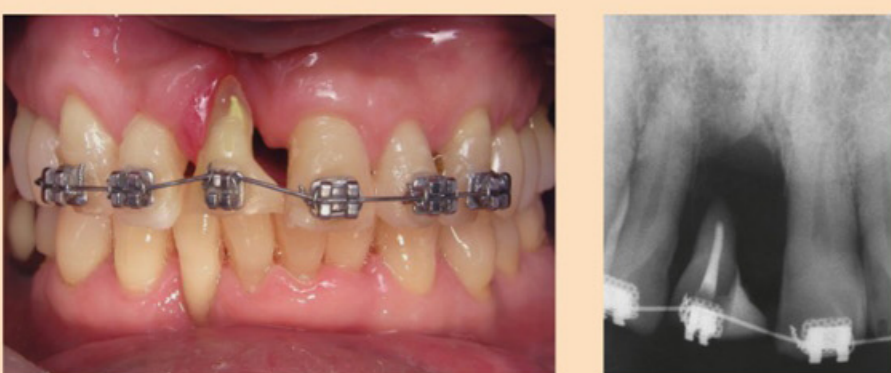


• Y N S (45, M)

#11 was determined to be extracted due to periodontal disease combined with severe gingival recession. If we extract #11 teeth and implant the fixture immediately, unesthetic final result was expected due to severe bone and soft tissue defect around #11 teeth. So we planned to implant the fixture after implant site development using orthodontic extrusion of #11 teeth to regenerate the soft and hard tissue around #11. We planned do also GBR(guided bone regeneration) procedure simultaneously during 1st implantation surgery. We thought that the soft tissue gained by orthodontic extrusion is very critical for the success of GBR, because tension free and primary closure is essential for success of GBR in these case. Increased soft tissue gained by orthodontic extrusion will be helpful to accomplish tension free suture and primary closure.



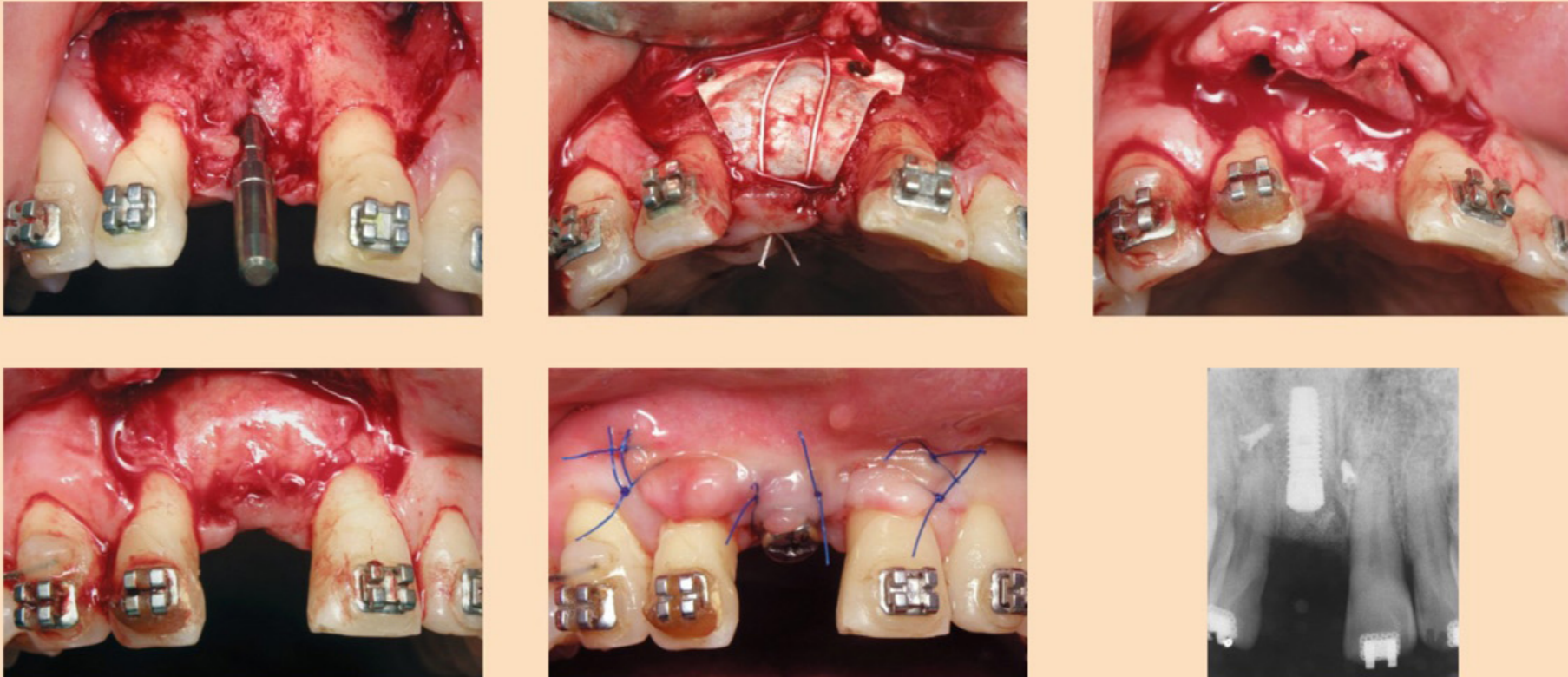
Orthodontic brackets were bonded passively by indirect bonding technique. Extrusion force was applied by 016" Ni-Ti wire. Endodontic treatment and incisal reduction was done according to the orthodontic extrusion progress.



1 months later after orthodontic extrusion, we can see periodontal tissue around the #11 is well developed for implantation.



3 months later after orthodontic extrusion, a small hole was made on the #11 teeth root because there were no space to bond the orthodontic bracket. Red tissue is inner sulcular epithelium, typical figure that can be seen in the progress of orthodontic extrusion. We can see that enough soft and hard tissue is prepared for implantation surgery and GBR procedure.



3 months after orthodontic extrusion, we did 1st implantation surgery. After removing the root, 1st implantaion surgery was done simultaneously. We can see new bone and soft tissue formation according to the accompanying extrusion of periodontal attachment apparatus. 3.8mm diameter, 12mm length and SLA surface treated Implantium® (Dentium, Seoul, Korea) fixture was used. It was submerged and GBR procedure were done. Graft material was autogenous bone harvested from ANS(anterior nasal spine) and xenograt material (BBP®, Oscotec, Korea) and e-PTFE non-resorbable membrane GORE-TEX® (W.L Gore & Associates, Inc.) were used. The membrane was fixed by two 2mm length bone screws (Jeil medical cooperation, Seoul, Korea) and vertical mattress suture. Because soft tissue was stretched and regenerated by orthodontic extrusion, it was very helpful to achieve tension-free suture and primary closure without any complication such as infection and membrane exposure. 8 months later after 1st implant surgery, 2nd surgery and membrane removal were done. We can see newly formed hard tissue under the membrane.



Clinical photo and X-ray right after final prosthetic crown (PFM) delivery. We can see esthetic result when compared with 1st visit photo.



1 years follow up clinical photo and X-ray after final prosthetic delivery. We can see the gingival creeping phenomenon and filling the embrasure space spontaneously and black triangle between #11 fixture and #21 is decreased. Marginal bone level around the fixture top is well maintained in the X-ray.

Extraction case due to recurrent periodontal abscess.



• K H G (56, M)

#11 teeth was involved recurrent periodontal abscess and we tried periodontal treatment, but it recurred. We planned #11 extraction and implant replacement. If we extract #11 teeth and implant immediately, implant osseointegration failure and unesthetic crown was expected because there was severe inflammation. So we planned to implant the fixture after implant site development using orthodontic extrusion of #11 teeth to regenerate the soft and hard tissue around #11 and reduce the inflammation around #11 teeth.



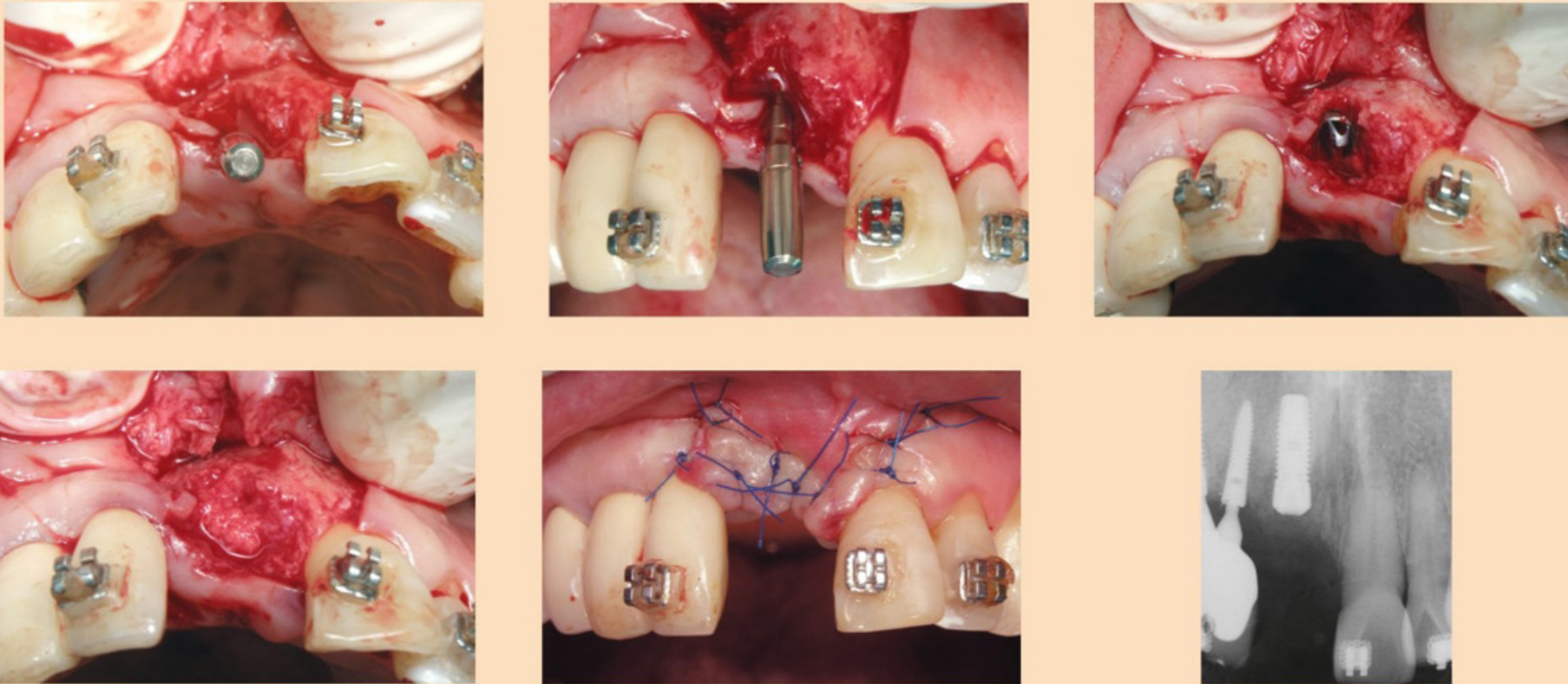
Orthodontic brackets were bonded passively by indirect bonding technique. Extrusion force was applied by 016" Ni-Ti wire. Incisal reduction was done according to the orthodontic extrusion progress.



1 months later after orthodontic extrusion, gingival swelling and redness is reduced, according to the extrusion of the #11 teeth.



3 months later after orthodontic extrusion, inner sulcular epithelium was seen and implant site was developed.



3 months after orthodontic extrusion, we did 1st implantation surgery. After removing the root, 1st implantaion surgery was done simultaneously. We can see new bone and soft tissue formation according to the accompanying extrusion of periodontal attachment apparatus. 3.8mm diameter, 12mm length and SLA surface treated Implantium® (Dentium, Seoul, Korea) fixture was used. It was submerged and autogenous bone chips gathered during drilling procedure were grafted. 4 months later after 1st implant surgery, 2nd surgery was done.



Clinical photo and X-ray right after final prosthetic crown (PFM) delivery. We can see somewhat bleached gingiva appearance.



6 months follow up clinical photo and X-ray after final prosthetic delivery. We can see relatively healthy and esthetic result when compared with 1st visit photo. Marginal bone level around fixture top is well maintained in the X-ray.

Conclusions

Orthodontic extrusion is minimal invasive and can be used to regenerate soft and hard tissue in periodontally compromised patients. Passive wire bending, passive wire bonding and indirect bracketing technique will facilitate orthodontic extrusion for anterior implant site development.