Tooth or Dental Implant
Decision Making by Prognosis and Strategic Value Following Periodontal Regenerative Procedures

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At the turn of the twentieth century, periodontal regeneration has gain much attention due to its ability to restore the lost periodontium once was thought difficult to regain. In doing so, periodontal regenerative therapy has even contributed to the retention of severe periodontally involved hopeless teeth. However, this treatment modality had soon met great resistance by the emergence and steady growth of dental implant which claimed to have the ability to replace poor diseased natural roots with a better future.

It is the purpose of this paper, from the therapeutic perspective of a clinical periodontal practitioner, to develop a judging principle utilizing cross matching of prognosis and strategic value of the severely involved teeth with periodontitis to determine the optimal choice for periodontal regeneration or dental implant. In addition, the clinical significance and limitation of various periodontal regenerative procedures will also be discussed in terms of quality and quantity.

Careful evaluation must be exercised as a periodontist providing the best capability in preserving natural dentition for the maximum benefit of the patient.

Introduction
Before entering twenty first century, human has developed two major treatment modalities for natural tooth: Periodontal Regeneration for preservation and Dental Implant for replacement. Emerging back to back, these two diverse treatments appear mutually contradicting yet can be working with each other. Balanced decision making is based on the understanding of capability and limitation of periodontal regeneration for preservation of the natural dentition as the priority then the replacement regimen by dental implant. Together, they will lead hand in hand oral rehabilitation in dentistry into a brighter future in this new century.
In the AAP newest edition of Glossary of Terms, “regeneration” was defined as “reproduction or reconstruction of a lost or injured part”. “Periodontal Regeneration” thus can be termed as “reconstruction of lost periodontium”. Clinically, gain in attachment is the key evidence whereas the restoration of periodontal ligament (PDL) is the key histological evidence of periodontal regeneration. Lindhe listed seven regenerative procedures as the followings:

1. 1926: “Scaling & Root Planing” (Fig1 & Fig2 before, Fig3 & Fig4 after TX) from McCall
2. 1957: “Flap debridement” (Fig5 before Fig6 after TX) from Prichard
3. 1976: “Modified Widman Flap” (Fig7 before and Fig8 after TX) from Rosling
4. 1964: “Bone Grafting” (Fig9 before and Fig10 after TX) from Mann
5. 1983: “Root Surface Modification” from Stahl
6. 1984: “Guided Tissue Regeneration” (Fig11 before and Fig12 after TX) from Gottlow
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7) 1987: “Growth Regulatory Factor” from Terranova

8) 1997: “Enamel Matrix Derivatives” (Fig13 before and Fig14 after TX) from Hammarstrom

There are eight procedures chronologically. All the above treatment can clinically fulfill the goal of periodontal therapy in reducing pockets, gain in attachment and radiographic alveolar bone fill during healing. Quantitatively, the favorable amount of average change expressed in mini-meter from each procedure after healing was divided into three groups:

Group A-2mm change: procedure 1), 2), and 3)
Group B-3mm change: procedure 4) and 5)
Group C-4mm change: procedure 6), 7) and 8)

Group B is also known as bone inductive surgery whereas Group C as periodontal regeneration. Group B and C are both included as reconstructive surgery.

From a different angle of analysis, the “quality” aspect of the above regenerative procedures nevertheless can only be evaluated whether the lost periodontal tissues: bone, cementum, PDL and gingiva are restored in appropriate proportion histologically. Deepened sulcus, long jucntional epithelium and connective tissue paralleling the root surface will likely form without healing of the desirable tissues. These “repair” healing phenomenon was the evidence found in Group A. On the other hand, histological healing was also found with connective tissue anchoring into the newly formed cementum or coronal growth of alveolar bone but absence of PDL. These healing phenomenon commonly evidenced in Group B was called “new attachment”.

As for the ultimate goal of periodontal therapy: “regeneration of a functional attachment apparatus” can most likely be achieved in Group C. Noteworthy, therapeutic procedure doesn’t guarantee the desirable outcome histologically. Ill-performed attempt can easily fall short of the regenerative potential and settled with less desirable healing as “repair” or “new attachment”. However, as a clinician, the quality of the healing appears to be overshadowed the quantity of healing.

Traditionally, periodontal resective procedures including osseous surgery and root resection were utilized to control periodontal disease and prevent the need for tooth removal in the future. However, periodontal regeneration is often time the last resort in nowadays for tooth retention if surgically reduced periodontium become undesirable.
According to Dr. Mellonig, periodontal regeneration is indicated for deep intraosseous defect, furcation defect (II maybe III), endangered teeth in seek of periodontal support and tooth retention11). Before making the decision to preserve or to remove the teeth with severe periodontal disease, one must consult the planning for usage of the involved teeth. This can be approached in cross matching of the “prognosis” and “strategic value”.

Based on the increasing functional demand, the strategic value of the teeth can be classified as the following four categories:

I. Single Non-Functional (SNF)
II. Single Functional (SF)
III. Secondary Abutment (SA)
IV. Primary Abutment (PA)

On the other hand, the range of periodontal prognosis and its respective % of bony destruction tooth survival utilizing Dr. McGuire’s classification12) can be determined in the following table: (table 1)

Matching matrix in order of range of prognosis and its corresponding strategic value following various groups of periodontal regenerative procedure was suggested as the following table: (table 2)

Generally speaking, teeth with good prognosis can be applied to highest strategic demand- category IV (PA) following all treatment groups. Teeth with fair prognosis treated with Group A can be applied to category III (SA) and even to IV (PA) if reconstructive surgery (Group B & C) is applicable. For teeth with poor prognosis, reconstructive surgery can be used to improve its strategic value from II (SF) to III (SA) and may be IV (PA) if favorable root morphology (long and/or divergent), defect topography (II and/or III) and tooth mobility (caused by inflammation and controllable trauma) was displayed. Questionable teeth, however, given successful periodontal regeneration (Group C) can be utilized from category II (SF) to III (SA) if tooth has long divergent root, more than one defect wall and absence of proximal furcations (Fig15 before and Fig16 after GTR TX). As for teeth classified “Hopeless”, can be retained in category I (SNF) following Group A therapy (Fig17) and sometimes II (SF) if reconstructive surgery was applied in conjunction with treating its neighboring teeth because its rewarding value.
doesn't warrant the use of periodontal regeneration alone. Although teeth placed in poor to hopeless prognosis during diagnostic phase may subjected to extraction and to be replaced by dental implant, the chances for actual removal following treatment is surprisingly low: 13%, 56% and 62% respectively.

**Conclusion**

Tooth or Dental Implant? To preserve or to replace? Realizing the fact that teeth with hopeless prognosis doesn't meant for extraction and teeth with poor or questionable prognosis shouldn't be treated as useless. Proper treatment modality for severe periodontally involved teeth can only be executed from proper determination of prognosis following therapy. In the discovery of numerous long term follow-up studies, periodontal regenerative procedures provide great potential to prolong the longevity of compromised dentition with teeth of poor, questionable and hopeless prognosis. Unfortunately, it is advocated widely that "unless tooth is very good, dental implant is better". As a dentist in the world of co-existing periodontal regeneration and dental implant, not only should we learn how to be a master in placing implant but also a master in preserving natural dentition. Only when periodontal regeneration and dental implant can work in synchronization can the world of dentistry be as ethical and righteous as possible.

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**References**