

SURGICAL PERIODONTICS: REGENERATIVE PROCEDURES

Policy Number: DCP014.04

Effective Date: April 1, 2018

Table of Contents	Page
INSTRUCTIONS FOR USE	1
BENEFIT CONSIDERATIONS	1
COVERAGE RATIONALE	1
DEFINITIONS	2
APPLICABLE CODES	3
DESCRIPTION OF SERVICES	4
CLINICAL EVIDENCE	4
U.S. FOOD AND DRUG ADMINISTRATION	7
REFERENCES	7
POLICY HISTORY/REVISION INFORMATION	8

Related Dental Policies
<ul style="list-style-type: none"> • Full Mouth Debridement • Implants • Non-Surgical Periodontal Therapy • Provisional Splinting • Surgical Endodontics • Surgical Periodontics: Mucogingival Procedures • Surgical Periodontics: Resective Procedures

INSTRUCTIONS FOR USE

This Dental Coverage Policy provides assistance in interpreting UnitedHealthcare dental benefit plans. When deciding coverage, the member specific benefit plan document must be referenced. The terms of the member specific benefit plan document [e.g., Certificate of Coverage (COC), Schedule of Benefits (SOB), and/or Summary Plan Description (SPD)] may differ greatly from the standard benefit plan upon which this Dental Coverage Policy is based. In the event of a conflict, the member specific benefit plan document supersedes this Dental Coverage Policy. All reviewers must first identify member eligibility, any federal or state regulatory requirements, and the member specific benefit plan coverage prior to use of this Dental Coverage Policy. Other Clinical Policies and Coverage Guidelines may apply. UnitedHealthcare reserves the right, in its sole discretion, to modify its Policies and Guidelines as necessary. This Dental Coverage Policy is provided for informational purposes. It does not constitute medical advice.

BENEFIT CONSIDERATIONS

Before using this policy, please check the member specific benefit plan document and any federal or state mandates, if applicable.

Essential Health Benefits for Individual and Small Group

For plan years beginning on or after January 1, 2014, the Affordable Care Act of 2010 (ACA) requires fully insured non-grandfathered individual and small group health plans (inside and outside of Exchanges) to provide coverage for Pediatric Dental Essential Health Benefits ("EHBs"). Large group plans (both self-funded and fully insured), and small group ASO plans, are not subject to the requirement to offer coverage for Pediatric Dental EHBs. However, if such plans choose to provide coverage for benefits which are deemed Pediatric Dental EHBs, the ACA requires all dollar limits on those benefits to be removed on all Grandfathered and Non-Grandfathered plans. The determination of which benefits constitute Pediatric Dental EHBs is made on a state by state basis. As such, when using this policy, it is important to refer to the member specific benefit plan document to determine benefit coverage.

COVERAGE RATIONALE

Bone Replacement Grafts

Bone Replacement Grafts are indicated for the following:

- Infrabony/Intrabony vertical defects
- Class II furcation involvements

Bone Replacement Grafts are not indicated for the following:

- Class I furcation involvement
- Class III or higher furcation involvement
- Non-vertical defects
- Individuals with an uncontrolled underlying medical condition
- Individuals who have been non-compliant with previous periodontal therapies
- Individuals with poor oral hygiene

- Teeth with a hopeless prognosis (more than 75% bone loss and Class 3 or higher mobility)

Biologic Materials to Aid in Soft and Osseous Tissue Regeneration

Biologic Materials to aid in soft and osseous tissue regeneration are intended to enhance periodontal tissue regeneration and healing for mucogingival defects in conjunction with mucogingival surgeries. There is inconclusive clinical evidence demonstrating the benefit of these materials in published peer-reviewed literature and further clinical studies are needed.

Biologic Materials to aid in soft and osseous tissue regeneration are not indicated for the following:

- Class I and Class III or higher furcation involvement
- Non-vertical defects
- Individuals with an uncontrolled underlying medical condition
- Individuals who have been non-compliant with previous periodontal therapies
- Individuals with poor oral hygiene
- Teeth with a hopeless prognosis (more than 75% bone loss and Class 3 or higher mobility).

Guided Tissue Regeneration – Resorbable and Non-Resorbable Barrier (Includes Membrane Removal)

Guided Tissue Regeneration is indicated for the following:

- Intrabony/infrabony vertical defects
- Class II furcation involvements

Guided Tissue Regeneration is not indicated for the following:

- Teeth with a hopeless prognosis (more than 75% bone loss and Class 3 or higher mobility)
- Class I furcation involvement
- Class III or higher furcation involvement
- Horizontal bone loss
- Non-vertical defects
- Individuals with an uncontrolled underlying medical condition
- Individuals who have been non-compliant with previous periodontal therapies
- Individuals with poor oral hygiene
- Crater defects

Surgical Revision Procedure (per Tooth)

Surgical Revision Procedure is indicated to correct an abnormal healing response that interferes with the therapeutic goals of the original regenerative surgical procedure.

Surgical Revision Procedure is not indicated solely for cosmetic/aesthetic purposes.

DEFINITIONS

Anatomical Crown: That portion of tooth normally covered by, and including, enamel. (ADA)

Biologic Materials: Agents that alter wound healing or host-tumor interaction. Such materials can include cytokines, growth factor, or vaccines, but do not include any actual hard or soft tissue graft material. These agents are added to graft material or used alone to effect acceleration of healing or regeneration in hard and soft tissue surgical procedures. Also known as biologic response modifiers. (ADA)

Flap: A loosened section of tissue separated from the surrounding tissues except at its base. (ADA)

Furcation: The anatomic area of a multirooted tooth where the roots diverge. A furcation involvement refers to loss of periodontal support in a furcation (ADA). The Glickman Classification of Tooth Furcation Grading (Sims, 2015):

- Grade I
 - Incipient
 - Just barely detectable with examination hand instruments
 - No horizontal component of the furcation is evident on probing
- Grade II
 - Early bone loss
 - Examination hand instrument goes partially into the furcation, but not all the way through
 - Furcation may be grade II on both sides of the tooth, but are not connected
- Grade III
 - Advanced bone loss
 - Examination hand instrument goes all the way through furcation, to other side of tooth
 - Furcation is through-and-through

- Grade IV
 - Through-and-through, plus furcation is clinically visible due to gingival recession

Gingival Flap: A flap that does not extend apical to the mucogingival junction. (ADA)

Guided Tissue Regeneration: A surgical procedure with the goal of achieving new bone, cementum, and PDL attachment to a periodontally diseased tooth, using barrier devices or membranes to provide space maintenance, epithelial exclusion, and wound stabilization. (AAP)

McGuire Classification of Tooth Prognosis: (Levi 2016)

- Good: Teeth with adequate periodontal support where the etiologic factors can be controlled, including systemic factors
- Fair: No more than 25% attachment loss with Grade 1 furcation invasion which can be maintained. Plaque control and systemic factors can be maintained
- Poor: As much as 50% bone loss with Grade II furcation invasions, poor crown: root ratio; mobility greater than Miller Class I; systemic factors; poor patient participation in treatment
- Questionable: Teeth with greater than 50% attachment loss; Grade II or III furcation involvements; the tooth is not easily maintained either with professional hygiene or by the patient
- Hopeless: Inadequate attachment to support the tooth; Class III or IV furcation involvement; Miller Class III mobility; the tooth cannot be maintained with adequate plaque control by the clinician or by the patient

Mobility: The movement of a tooth in its socket resulting from an applied force. (AAP) Miller Index of Tooth Mobility (Harpenau 2013):

- Class 0: Normal physiologic tooth movement
- Class I: First distinguishable signs of movement beyond normal
- Class II: Tooth movement up to 1mm in any direction
- Class III: Tooth can be moved more than 1mm in any direction and/or the tooth can be depressed into the socket

Osseous Surgery: Procedures to modify bone support altered by periodontal disease, either by reshaping the alveolar process to achieve physiologic form without the removal of alveolar supporting bone, or by the removal of some alveolar bone, thus changing the position of the crestal bone relative to the tooth root. (See: Ostectomy; Osteoplasty)

Quadrant: One of the four equal sections into which the dental arches can be divided; begins at the midline of the arch and extends distally to the last tooth. (ADA)

Site: A term used to describe a single area, position, or locus. The word "site" is frequently used to indicate an area of soft tissue recession on a single tooth or an osseous defect adjacent to a single tooth; also used to indicate soft tissue defects and/or osseous defects in edentulous tooth positions. (ADA)

- If two contiguous teeth have areas of soft tissue recession, each area of recession is a single site.
- If two contiguous teeth have adjacent but separate osseous defects, each defect is a single site.
- If two contiguous teeth have a communicating interproximal osseous defect, it should be considered a single site.
- All non-communicating osseous defects are single sites.
- All edentulous non-contiguous tooth positions are single sites.
- Depending on the dimensions of the defect, up to two contiguous edentulous tooth positions may be considered a single site.

Tooth Bounded Space: A space created by one or more missing teeth that has a tooth on each side. (ADA)

APPLICABLE CODES

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by the member specific benefit plan document and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Clinical Policies and Coverage Guidelines may apply.

CDT Code	Description
D4263	Bone replacement graft – retained natural tooth – first site in quadrant
D4264	Bone replacement graft – retained natural tooth – each additional site in quadrant
D4265	Biologic materials to aid in soft and osseous tissue regeneration
D4266	Guided tissue regeneration – resorbable barrier, per site

CDT Code	Description
D4267	Guided tissue regeneration – nonresorbable barrier, per site (includes membrane removal)
D4268	Surgical revision procedure, per tooth
D4999	Unspecified periodontal procedure, by report

CDT® is a registered trademark of the American Dental Association

DESCRIPTION OF SERVICES

The American Academy of Periodontology (AAP) guidelines stress that periodontal health should be achieved in the least invasive and cost effective manner. Using non-surgical periodontal therapy, many individuals can be treated and maintained without the need for surgical intervention. However, surgical procedures may be required when periodontal health cannot be achieved or maintained non-surgically. Regenerative procedures involve bone grafting, which is the clinical restoration of bone tissue in a treated periodontal defect, and Guided Tissue Regeneration which attempts to regenerate lost periodontal structures, as well as the use of Biological Materials to aid in these processes. Bone grafting, Guided Tissue Regeneration and the use of Biological Materials to aid in tissue regeneration have applications in different areas of dentistry, and each has its own coverage rationale and indications. Please see the procedure specific policy for details.

CLINICAL EVIDENCE

Ravi et al. (2017) completed a split-mouth randomized controlled clinical trial to assess the effect of plasma rich growth factor (PRGF) associated with guided tissue regeneration (GTR) versus GTR only in the treatment of intrabony defects (IBDs) in patients with chronic periodontitis (CP). Patients with CP with 42 contralateral 2- and 3-walled defects were randomly assigned to test (PRGF+GTR) and control (GTR alone) treatment groups. Clinical and radiographic assessments performed at baseline and after 6 months were: gingival index (GI), probing depth (PD), clinical attachment level (CAL), radiologic defect depth, and bone fill. The results demonstrated that the parameters measured at baseline and after 6 months showed mean PD reduction of 3.37 ± 1.62 mm in the control group and 4.13 ± 1.59 mm in the test group. There was a significant difference in mean change in CAL in the control group (5.42 ± 1.99) and the test group (5.99 ± 1.77). Mean change in GI was 1.89 ± 0.32 and 1.68 ± 0.58 in the control group and test group, respectively, and the difference was statistically significant. When compared between groups, clinical parameters did not show any statistically significant variations. Mean radiographic bone fill was 1.06 ± 0.81 and 1.0 ± 0.97 in the control group and test group, respectively. However, the difference was not statistically significant. The authors concluded that PRGF with GTR, as well as GTR alone, was effective in improving clinical and radiographic parameters of patients with CP at the 6-month follow-up. There was no additive effect of PRGF when used along with GTR in the treatment of IBDs in patients with CP in terms of both clinical and radiologic outcomes.

Cieplik et al. (2017) completed a 13-year follow-up of a randomized controlled clinical split-mouth study on the influence of autogenous platelet concentrate (APC) on combined guided tissue regeneration (GTR)/graft therapy in intrabony defects. In 25 patients, two deep contra-lateral intrabony defects were treated according to GTR using β -TCP and bio-resorbable membranes. In test defects, APC was applied additionally. After 13 years, clinical healing results were assessed and compared to results at baseline and after 1 year, and a tooth survival analysis completed. After 13 years, 22 patients were available for tooth survival analysis showing 81.8% of test and 86.4% of control teeth still in situ. Based on the 15 patients still available for split-mouth analysis, median CAL was 10.0 mm in test and 12.0 mm in control sites at baseline. After 1 year, both groups revealed significant CAL gains of 5.0 mm, followed by a new CAL loss of 1.0 mm in the following 12 years. There were no significant differences between test and control sites. The authors concluded that within the limits of this study, the data shows that most of the CAL gain following GTR can be maintained over 13 years. The additional use of APC had no positive influence on the long-term stability.

Miron et al. (2017) conducted a systematic review with the goal of gathering the extensive number of articles published to date on platelet rich fibrin (PRF) in the dental field to better understand the clinical procedures where PRF may be utilized to enhance tissue/bone formation. Randomized clinical trials were searched systematically until May 2016 and separated into the following categories: intrabony and furcation defect regeneration, extraction socket management, sinus lifting procedures, gingival recession treatment, and guided bone regeneration (GBR) including horizontal/vertical bone augmentation procedures. In total, 35 articles were selected and divided accordingly. Overall, the use of PRF has been most investigated in periodontology for the treatment of periodontal intrabony defects and gingival recessions where the majority of studies have demonstrated favorable results in soft tissue management and repair. Little to no randomized clinical trials were found for extraction socket management, although PRF has been shown to significantly decrease dry sockets complications in third molar sites. Little to no data was available directly investigating the effects of PRF on new bone formation in GBR, horizontal/vertical bone augmentation procedures, treatment of peri-implantitis, and sinus lifting procedures. The authors concluded that investigation supports the use of PRF for periodontal and soft tissue repair. There remains a lack of well-conducted studies demonstrating

convincingly the role of PRF during hard tissue bone regeneration. Future human randomized clinical studies evaluating the use of PRF on bone formation are necessary.

Wu et al. (2017) conducted a systematic review and meta-analysis regarding the long-term differences in treatment outcomes between periodontal regeneration therapies and flap surgery. A systematic literature search was conducted up to June 2016. Treatment outcomes were changes in pocket depth and clinical attachment level.

A total of 52 randomized controlled trials were included in this longitudinal meta-analysis. The follow-up length ranged from 0.5 year to 10 years. The trends in the treatment outcomes were similar under different correlation structures. Enamel matrix derivatives (EMD) and guided tissue regeneration (GTR) achieved greater probing pocket depth (PPD) reduction and clinical attachment level (CAL) gain than flap operation (FO) in the long-term follow up, but no differences were found between EMD and GTR. The authors concluded that compared with flap surgery, periodontal regeneration surgeries achieved greater PPD reduction and gain in CAL after 1 year, and its effects may last for 5-10 years.

Avila-Ortiz et al. (2015) conducted a systematic review from the American Academy of Periodontology Regeneration Workshop based on predetermined eligibility criteria to identify human original studies and systematic reviews on the topic of periodontal regeneration of furcation defects. The final selection consisted of 150 articles, of which six were systematic reviews, 109 were clinical trials, 27 were case series, and eight were case reports. A summary of the main findings of previously published systematic reviews and the available evidence regarding regenerative approaches for furcation defects compared with conventional surgical therapy were reviewed. On the basis of the reviewed evidence, the authors concluded that periodontal regeneration has been demonstrated histologically and clinically for the treatment of maxillary facial or interproximal and mandibular facial or lingual Class II furcation defects. For Class I defects, the majority can be successfully treated with non-regenerative treatment, and for Class III lesions, the evidence is lacking and limited to case reports.

Galav et al (2016) conducted a randomized controlled trial to compare the clinical efficacy of platelet-rich fibrin (PRF) with autogenous bone grafting (ABG) for the treatment of intra bony defects (IBD's) in chronic periodontitis. Twenty chronic periodontitis patients with IBDs were randomly treated by PRF or ABG. Probing pocket depth (PPD), relative attachment level (RAL), surgical reentry bone fills, and radiographic bone fill (RBF) were recorded at baseline, 3, 6, and 9 months postsurgery, respectively. Both PRF and ABG sites produced a significant improvement from baseline to 9 months for all the parameters. However, there was no significant difference between the two treatment modalities in the reduction of PPD and RAL gain at 9 months. In addition, ABG showed significantly greater RBF (30.34%) as compared to PRF (20.22%). Similar findings were supported by surgical reentry, where a surgical reentry of 65.31% at ABG sites and 43.64% at PRF sites was seen. The authors concluded that both ABG and PRF can be used predictably to reconstruct lost periodontal structures as indicated by PPD reduction and RAL gain. However, in terms of osseous defect fill, ABG yields more definitive outcome than PRF.

Ge et al. (2016) conducted a randomized controlled trial aimed to evaluate the effect of autogenous bone grafting in situ for regeneration of periodontal osseous defect distal to the second molar (M2) compared with non-grafting after impacted third molar (M3) removal. A total of 60 sites in adult patients were enrolled and randomly assigned to the control group or the test group. In both groups, the M3 was extracted using a piezo surgical device, and the distal root surface of M2 was scaled and root planed. In addition, the removed alveolar bone was ground to particles and grafted to the distal osseous defect of M2 in the test group. The primary outcome variable was the osseous defect depth (ODD), the secondary outcome variables were probing pocket depth (PD) and clinical attachment level (CAL) on the disto-buccal aspect of the M2 during a 12-month follow-up period. The patient characteristics were homogeneous between the 2 groups. Six and 12 months after surgery, there were statistically significant bone fill in both groups. Moreover, the ODD and CAL in the test group were significantly lower than the control group at every postoperative re-entry. The result of this study demonstrated that scaling and root planing is beneficial to periodontal healing of M2 after impacted M3 extraction. Addition of autogenous bone grafting for the treatment of osseous defects distal to M2 was safe and more effective than periodontal treatment alone.

Kao and Nares (2015) conducted this review to update the last published systematic review on periodontal regeneration from 2002 by reviewing approaches developed for the correction of intrabony defects with the focus on patient-, tooth-, and site-centered factors, surgical approaches, surgical determinants, and biologics. This review focused on clinically available regenerative approaches with histologic evidence of periodontal regeneration in humans. (For topics in which the literature is lacking, non-randomized observational and experimental animal model studies were used). Therapeutic endpoints examined were: changes in clinical attachment level, changes in bone level/fill (For purposes of analysis, change in bone fill was used as the primary outcome measure, except in cases in which this information was not available), and probing depth. There were fifty-eight studies in the treatment of intrabony defects, and forty-five on the use of biologics for the treatment of intrabony defects. The authors concluded that biologics (enamel matrix derivative and recombinant human platelet-derived growth factor-BB plus β -tricalcium phosphate) are generally comparable with demineralized freeze-dried bone allograft and guided tissue regeneration (GTR), and

superior to open flap debridement procedures alone in improving clinical parameters in the treatment of intrabony defects. Clinical outcomes appear most influenced by patient behaviors and surgical approach rather than by tooth and defect characteristics. The long-term studies reviewed indicate that improvements in clinical parameters are maintainable up to 10 years, even in severely compromised teeth, resulting in a favorable long-term prognosis.

Nevins et al. (2013) provided results from a 36-month extension study of a multicenter, randomized, controlled clinical trial evaluating the effect and long-term stability of homodimer platelet derived growth factor (PDGF-BB) treatment in patients with localized severe periodontal osseous defects. A total of 135 participants were enrolled from six clinical centers for this trial, and eighty-three individuals completed the study at 36 months and were included in the analysis. The study investigated the local application of β -tricalcium phosphate scaffold matrix with or without two different dose levels of PDGF (0.3 or 1.0 mg/mL PDGF-BB) in patients possessing one localized periodontal osseous defect. Clinical and radiographic evidence of treatment success was defined as percentage of cases with clinical attachment level (CAL) ≥ 2.7 mm and linear bone growth (LBG) ≥ 1.1 mm. Although there were no significant increases in CAL and LBG at 36 months among all groups, there were continued increases in CAL gain, LBG, and percentage bone fill over time, suggesting overall stability of the regenerative response. The authors concluded that PDGF-BB in a synthetic scaffold matrix promotes long-term stable clinical and radiographic improvements in patients with localized severe periodontal osseous defects.

Pradeep et al. (2012) completed a randomized controlled clinical trial to explore the clinical and radiographic effectiveness of autologous platelet rich fibrin (PRF) and platelet rich plasma (PRP) in the treatment of 3 walled intrabony periodontal defects. Ninety intrabony defects were selected and treated with open flap debridement and PRF, open flap debridement and PRP and open flap debridement alone as the control group. Clinical and radiologic parameters, of probing depth (PD), clinical attachment level (CAL), intrabony defect depth, and percentage of defect fill were all recorded at baseline and 9 months postoperatively. This study showed improvements in all parameters with the most significant being the decreased depth of the defect. The authors concluded that both PRF and PRP in conjunction with open flap debridement show improvements in all clinical and radiographic parameters measured and that PRF is less time consuming and less technique sensitive, and may be a better treatment option than PRP. However, long-term, multicenter randomized, controlled clinical trials will be required to know their clinical and radiographic effects on bone regeneration.

Shah et al. (2014) conducted a systematic review and meta-analysis to determine the clinical and radiographic outcomes of using platelet-rich fibrin (PRF) for the treatment of periodontal intra-bony defect (IBD) compared with open flap debridement (OFD). Studies investigating the effect of platelet concentrate in surgical procedure for the treatment of periodontal intra osseous defects compared with the control group in which platelet concentrate was not used were included. A total of 298 sites were treated using PRF either in combination with graft or as a monotherapy in comparison to traditional OFD procedure. The meta-analysis showed a standard mean difference of 0.95 mm in clinical attachment level (CAL) and 2.33 mm in IBD after treatment of IBD with PRF compared with OFD. The authors concluded that clinically significant improvements in periodontal parameters such as CAL, IBD, and reduction in probing depth were achieved when IBDs were treated with PRF alone when compared to OFD.

Slotte et al. (2012) conducted a randomized study to evaluate healing after open-flap debridement (OF) of intrabony periodontal defects alone or with adjunct treatment with bovine bone material grafts (BBM). There were 32 patients with 32 intrabony periodontal defects selected. After initial periodontal scaling and root planing, full-thickness flaps were raised and root surfaces and defects were debrided. Patients were then randomly assigned to treatment groups, either OF alone or combined with defect fill with BBM, and followed in a strict postoperative maintenance care program for 12 months. Upon assessment of results at 12 month point, none of the following parameters showed significant intergroup differences: gingival recession, probing depth, gain in clinical attachment level and probing bone level. However, radiographically, there were significant changes in the intrabony defect. The authors concluded that both procedures had similar outcomes of improved periodontal conditions, and that the addition of BBM provided the greatest improvement in the radiographic appearance of intrabony defects.

Sohrabi et al. (2012) conducted a meta-analysis of randomized controlled clinical trials to evaluate bioactive glass in the treatment of intrabony and furcation defects. Criteria included publication in English, follow-up duration of ≥ 6 months, baseline and follow-up measures of probing depth (PD) and clinical attachment levels (CAL) with 95% confidence intervals (CIs), and an appropriate control arm. Twenty-five citations were identified, 15 of which were included in the final analysis. Pooled analyses showed that BG was superior to control for both measures. CAL heterogeneity appeared secondary to active controls versus open flap debridement (OFD) alone and to defect-type modifying BG treatment success. Per subgroup analyses, the benefit of BG over control treatment was highly significant only in studies comparing BG to OFD. The authors concluded that treatment of intrabony defects with BG imparts a significant improvement in both PD and CAL compared to both active controls and OFD.

Stavropoulos and Karrig (2010) published the 6-year results of a randomized-controlled clinical trial evaluating guided tissue regeneration (GTR) combined with or without deproteinized bovine bone mineral (DBBM) in intrabony defects.

In 45 patients, one defect was treated with GTR combined with DBBM hydrated in saline (DBBM-) or gentamicin sulphate (DBBM+) or with GTR alone. Thirty-six patients (33 teeth) were available for the entire 6-year control. Clinical parameters of clinical attachment level (CAL) and probing depths (PDs) were recorded pre-surgery, and at 1 and 6 years postsurgery. These results showed statistically significant clinical improvements for all treatments, and periodontal conditions obtained after GTR treatment with or without the adjunct use of DBBM can be preserved on a long-term basis.

U.S. FOOD AND DRUG ADMINISTRATION (FDA)

Products used for bone grafting and resorbable and non-resorbable membranes for guided tissue regeneration use in periodontal applications are extensive. See the following websites for more information and search by product name in device name section: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmnm.cfm>. (Accessed December 2017)

Connective tissue grafting products from donated human skin are regulated by the (FDA) as human tissue for transplantation. They are processed and marketed in accordance with the FDA's requirements for banked human tissue (21 CFR, Part 1270 and Part 1271) and Standards for Tissue Banking of the American Association of Tissue Banks (AATB). Information is available at:

<http://www.fda.gov/BiologicsBloodVaccines/TissueTissueProducts/default.htm>. (Accessed December 2017)

Currently, there are two biologic products approved by the FDA for regenerative periodontal therapy:

- GEM 21S™ (Osteohealth Company, Division of Luitpold Pharmaceuticals, Inc.)
 - See the following website for more information:
http://www.accessdata.fda.gov/cdrh_docs/pdf4/P040013b.pdf. (Accessed December 2017)
- Emdogain™ (Straumann)
 - See the following website for more information:
<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=P930021>. (Accessed December 2017)

There are several devices cleared for marketing by FDA for point-of-care preparation of platelet-rich plasma (PRP) from a sample of a patient's blood (see listings under product code JQC for additional devices). See the following website for more information: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmnm.cfm>. (Accessed December 21, 2017)

In April 2003, the FDA approved the use of the GPS™ Platelet Separation Kit. The GPS™ separation kit aids separation of the patient's own blood components by density through the use of the GPS™-Thermo International Equipment Company (IEC) centrifuge. The GPS separation kit permits platelet rich plasma to be rapidly prepared from a small volume of the patient's blood that is drawn at the time of treatment. The GPS Platelet Separation Kit is designed for use in the clinical laboratory or intraoperatively at point of care, for the safe and effective preparation of platelet poor plasma and platelet concentrate from a small sample (50-60 ml) of whole blood. See the following website for more information: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmnm.cfm?ID=K030555>. (Accessed December 21, 2017)

REFERENCES

American Academy of Periodontology Glossary of Periodontal Terms.

American Academy of Periodontology Parameter on chronic periodontitis with slight to moderate loss of periodontal support. J Periodontol. 2000 May; 71(5 Suppl):853-5.

American Academy of Periodontology Parameter on chronic periodontitis with advanced loss of periodontal support. J Periodontol. 2000 May; 71(5 Suppl):853-5.

American Academy of Periodontology. Parameter on mucogingival conditions. JPeriodontol. 2000 May;71(5 Suppl):861-2.

American Dental Association CDT Codebook 2017.

American Dental Association Glossary of Clinical and Administrative Terms.

Avila-Ortiz G, De Buitrago JG, Reddy MS. Periodontal regeneration - furcation defects: a systematic review from the AAP Regeneration Workshop. J Periodontol.2015 Feb; 86(2 Suppl):S108-30.

Cieplik F, Tabenski L, Hiller KA, et al. Influence of autogenous platelet concentrate on combined GTR/graft therapy in intrabony defects: a 13-year follow-up of a randomized controlled clinical split-mouth study. J Clin Periodontol. 2017 Dec 15.

Cohen E, Funakoshi E. Atlas of Cosmetic and Reconstructive Periodontal Surgery, 3rd ed. Shelton, CT: People's Medical Publishing House c2007. Chapter 11, Guided Tissue Regeneration Indications; p. 164.

Galav S, Chandrashekar KT, Mishra R, et al. Comparative evaluation of platelet-rich fibrin and autogenous bone graft for the treatment of infrabony defects in chronic periodontitis: Clinical, radiological, and surgical reentry. *Indian J Dent Res.* 2016 Sep-Oct; 27(5):502-507.

Ge J, Yang C, Zheng J, Hu Y. Autogenous bone grafting for treatment of osseous defect after impacted mandibular third molar extraction: A randomized controlled trial. *Clin Implant Dent Relat Res.* 2016 Dec 8.

Harpenau L, Hall W. *Halls's Critical Decisions in Periodontology and Implantology*, 5th ed. Shelton, CT: People's Medical Publishing House c2013 Chapter 11, Mobility ; p.28.

Kao RT, Nares S, Reynolds MA. Periodontal regeneration - intrabony defects: a systematic review from the AAP Regeneration Workshop. *J Periodontol.* 2015 Feb; 86(2 Suppl):S77-104.

Klokkevold, PR, Camargo, P. *Atlas of Cosmetic and Reconstructive Periodontal Surgery*, 3rd ed. Shelton, CT: People's Medical Publishing House c2007. Chapter 95, Bone Fill Regenerative Procedures; p. 190.

Levi P, Rudy R, Jeong Y et al. *Non- Surgical Control of Periodontal Diseases: A Comprehensive Handbook.* Berlin, Heidelberg: Springer c2016. Chapter 1.6, Prognosis; p. 17.

Miron RJ, Zucchelli G, Pikos MA, et al. Use of platelet-rich fibrin in regenerative dentistry: a systematic review. *Clin Oral Investig.* 2017 Jul; 21(6):1913-1927. Nevins M, Kao RT, McGuire MK, et al. Platelet-derived growth factor promotes periodontal regeneration in localized osseous defects: 36-month extension results from a randomized, controlled, double-masked clinical trial. *J Periodontol.* 2013 Apr; 84(4):456-64.

Novak K, Takei H, Do J. *Carranza's Clinical Periodontology*, 12th ed. St. Louis: Elsevier c2015 Chapter 33, Determination of Prognosis; p.394-403.

Pradeep AR, Rao NS, Agarwal E, et al. Comparative evaluation of autologous platelet-rich fibrin and platelet-rich plasma in the treatment of 3-wall intrabony defects in chronic periodontitis: a randomized controlled clinical trial. *J Periodontol.* 2012 Dec; 83(12):1499-507.

Ravi S, Malaiappan S, Varghese S, et al. Additive Effect of Plasma Rich in Growth Factors With Guided Tissue Regeneration in Treatment of Intrabony Defects in Patients With Chronic Periodontitis: A Split-Mouth Randomized Controlled Clinical Trial. *J Periodontol.* 2017 Sep; 88(9):839-845. Shah M, Deshpande N, Bharwani A, et al. Effectiveness of autologous platelet-rich fibrin in the treatment of intra-bony defects: A systematic review and meta-analysis. *J Indian Soc Periodontol.* 2014 Nov-Dec; 18(6):698-704.

Sims T, Takei H. *Carranza's Clinical Periodontology*, 12th ed. St. Louis: Elsevier c2015 Chapter 62, Furcation; p.621-627.

Slotte C, Asklöw B, Sultan J, et al. A randomized study of open-flap surgery of 32 intrabony defects with and without adjunct bovine bone mineral treatment. *J Periodontol.* 2012 Aug; 83(8):999-1007.

Sohrabi K, Saraiya V, Laage TA, et al. An evaluation of bioactive glass in the treatment of periodontal defects: a meta-analysis of randomized controlled clinical trials. *J Periodontol.* 2012 Apr; 83(4):453-64.

Stavropoulos A, Karring T. Guided tissue regeneration combined with a deproteinized bovine bone mineral (Bio-Oss) in the treatment of intrabony periodontal defects: 6-year results from a randomized-controlled clinical trial. *J Clin Periodontol.* 2010 Feb; 37(2):200-10.

Takei H, Carranza F, Shin, K. *Carranza's Clinical Periodontology*, 12th ed. St. Louis: Saunders c2015. Chapter 56, Gingival Surgical Techniques; p. 576-581.

Wu YC, Lin LK, Song CJ, et al. Comparisons of periodontal regenerative therapies: A meta-analysis on the long-term efficacy. *J Clin Periodontol.* 2017 May; 44(5):511-519.

POLICY HISTORY/REVISION INFORMATION

Date	Action/Description
04/01/2018	<ul style="list-style-type: none"> • Revised coverage rationale: <ul style="list-style-type: none"> ○ Replaced references to "patients" with "individuals" ○ Updated coverage guidelines for biologic materials to aid in soft and osseous tissue regeneration: <ul style="list-style-type: none"> ▪ Removed language indicating biologic materials to aid in soft and osseous tissue regeneration are indicated for Intrabony/Infrabony vertical defects and Class II furcation involvements ▪ Added language to indicate: <ul style="list-style-type: none"> - Biologic materials to aid in soft and osseous tissue regeneration are intended to enhance periodontal tissue regeneration and healing for mucogingival defects in conjunction with mucogingival surgeries with or without guided tissue regeneration

Date	Action/Description
	<ul style="list-style-type: none"> - There is inconclusive clinical evidence demonstrating the benefit of these materials in published peer-reviewed literature and further clinical studies are needed • Updated definitions: <ul style="list-style-type: none"> ○ Added definition of: <ul style="list-style-type: none"> ▪ Biologic Materials ▪ Guided Tissue Regeneration ○ Removed definition of: <ul style="list-style-type: none"> ▪ Intrabony Defect (Intrabony D) ▪ Moderate Chronic Periodontal Disease ▪ Severe Chronic Periodontal Disease ○ Modified definition of: <ul style="list-style-type: none"> ▪ Anatomical Crown ▪ Flap ▪ Furcation ▪ Gingival Flap ▪ Quadrant ▪ Site ▪ Tooth Bounded Space • Updated supporting information to reflect the most current description of services, clinical evidence, FDA information, and references • Archived previous policy version DCP014.03