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Long-Term Results of Guided Tissue Regeneration Therapy with Non-Resorbable and Bioabsorbable Barriers. II Infrabony Defects

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Abstract

Objectives: The aim of this 5 year follow-up study was to evaluate clinically and radiographically the long-term results after GTR therapy of infrabony defects using non-resorbable and bioabsorbable barriers. Methods: In 12 patients suffering from advanced periodontitis 12 pairs of contralateral infrabony defects were treated. Within each patient one defect received a non-resorbable (ePTFE; control: C) and the other a bioabsorbable (Polyglactin 910; test: T) barrier by random assignment. At baseline, 6 and 60±3 months after surgery clinical parameters and standardized radiographs were obtained. Using digital subtraction analysis gain of bone relative density change (mean grey level change x area) within infrabony defects was assessed. Results: Eight of 12 patients were available for the 60-months re examinations. Six and 60±3 months after GTR therapy statistically significant ($p < 0.05$) vertical attachment (CAL-V) gain was observed in both groups (C6: 2.6±1.4 mm; C60: 1.6±1.5 mm; T6: 3.0±1.7 mm; T60: 3.0±0.7 mm). However, 60 months after GTR therapy 2 infrabony defects in the control group had lost all the attachment that had been gained 6 months after GTR therapy and a clinically relevant but statistically insignificant mean CAL-V loss of 1.0±2.1 mm was observed from 6 to 60 months. The study failed to show statistically significant differences between test and control regarding CAL-V gain 60 months after surgery. Also subtraction analysis failed to reveal statistically significant differences regarding density gain between both groups 6 and 60 months postsurgically (C6: 26.4±54.2; C60 62.8±112.7; T6: 68.7±72.8; T60: 84.1±83.6). Conclusions: CAL-V gain achieved after GTR therapy in infrabony defects using both non-resorbable and bioabsorbable barriers was quite stable after 5 years in 14 of 16 defects.

Objective

Comparison of the results of GTR therapy using non-resorbable and biodegradable barriers 5 years after periodontal surgery of infrabony defects.

Material and Methods

Patients

- 12 patients (9 female) 32-62 years of age.
- Untreated advanced periodontal disease.
- Each exhibiting at least one pair of contralateral interproximal infrabony defects.

Radiographic examinations

- Standardized bitewing radiographs of teeth with infrabony defects using modified film holders (VIP 2 Film Positioning, UpRad Corp., Fort Lauderdale, FL, USA) at baseline, 6, and 60±3 months after surgery.
- Intraoral dental films (Ultraspeed, Eastman Kodak Co., Rochester, NY, USA) size 2.
- x-ray source (Heliodent 70, 70 kV, 7 mA, Siemens, Bensheim, Germany).
- Development unit (Periomat, Dürr Dental GmbH, Bietigheim-Bissingen, Germany).

Clinical examinations

At 6 sites per tooth (baseline, 6, 60±3 months after surgery):

- Gingival Index (GI) and Plaque Index (PII).
- PD and CAL-V to the nearest 0.5 mm (PCPUNC 15).
- CAL-H to the nearest 0.5 mm in class II furcations (PQ2N).

Periodontal surgery

- Mucoperiosteal flap, thorough debridement, random assignment of therapies: in each patient a ePTFE barrier (Gore Tex Periodontal Membrane, W. L. Gore and Assoc., Flagstaff, AZ, USA) for one defect and a Polyglactin 910 (PG 910) barrier (Vicryl membrane, Ethicon, Norderstedt, Germany) for the other defect.
- Removal of ePTFE barrier after 4 to 6 weeks.

Bone measurements

After reflection of a full thickness flap and bone sounding without flap mobilisation 60±3 months after surgery:

- Distance cemento-enamel junction (CEJ) to the most apical extension of the bony defect (BD): PBL-V.

Radiographic evaluation

- Capturing of pairs of radiographs with a CCD camera: Cohu Solid State Camera, Cohu Inc., San Diego, CA, USA.
- Digital subtraction analysis with 512 x 480 pixels resolution and 256 gray levels (Variable Scan Frame Grabber; Imaging Tech. Inc., Woburn, MA, USA).
- Removal of contrast differences between images by gamma correction. Assessment of change of gray levels and relative density gain
- All radiographs were analysed by one examiner blinded to the clinical and intrasurgical measurements (EH).

Genetic examination

- All patients available for the 60±3 months re examination were tested for interleukin-1-polymorphism (Advanced Diagnostic Systems, Nehren, Germany).

Statistical analysis

- Kolmogorov-Smirnov/Lilliefors-Test for normal distribution.
- Comparison of baseline to 6 and 60 months postsurgical measurements by paired t test.
- Comparison between test (Polyglactin 910) and control (ePTFE) by paired t test.

Conclusions

- CAL-V gain achieved after GTR therapy in infrabony defects using both non-resorbable and bioabsorbable barriers was quite stable after 5 years in 14 of 16 defects.
- Beside patient charcteristics like smoking, interleukin-1-polymorphism or diabetes other perhaps site specific factors seem to influence stability of attachment gains.

Results

- Of 12 patients that originally started the study 8 were available for the 5 years of re examination.

	GI		PII		PD/mm	
	PG 910	ePTFE	PG 910	ePTFE	PG 910	ePTFE
Baseline	2.0±0.0	2.0±0.0	0.4±1.1	0.6±0.7	7.8±2.1	7.9±1.6
6 months	0.3±0.7	0.3±0.7	0.3±0.5	0.3±0.5	3.7±0.8	3.7±1.0
Change	-1.7±0.7	-1.7±0.7	-0.1±0.8	0.3±0.7	-4.1±1.7	-4.3±2.1
60 months	1.0±1.1	1.3±1.0	0.1±0.4	0.8±1.0	4.2±1.1	5.3±1.9
Change	-1.0±1.1	-0.7±1.0	-0.3±1.2	0.2±1.2	-3.6±1.8	-2.7±2.0

Tab. 1: Clinical parameters (mean±SD)

	PG 910		ePTFE	*p<0.05
	INFRA	CAL-V	INFRA	CAL-V
Baseline	4.2±1.1	7.9±1.9	3.7±1.3	8.0±2.0
6 months		4.9±1.1*		5.4±1.5*
Change		3.0±1.7		2.6±1.4
60 months		4.9±1.8*		6.4±2.3*
Change		3.0±0.7		1.6±1.5

Tab. 2: Vertical attachment levels/mm (mean±SD)

	PG 910		ePTFE	*p<0.05
	PBL-V /mm	rel. density gain	PBL-V /mm	rel. density gain
Baseline	8.4±2.1		8.0±2.4	
6 months		68.66±72.84		26.41±54.18
60 months	6.2±1.7		6.5±2.0	
Change	2.2±1.1*	84.08±83.62	1.5±1.2	62.80±112.65

Tab. 3: Bone parameters (mean±SD)

patient#	age	teeth test/control	defect site	regular recalls	number of recalls	mean±SD GBI	PCR	smoking	interleukin-1beta	other
1	62	24/ 14	mesial	+	11	12.4±6.7	33.8±13.4	-	+	-
2	49	47/ 37	mesial	+	11	4.0±3.0	27.6±6.1	-	+	-
3	46	34/ 43	mesial	-	9	6.4±4.8	25.1±6.9	+	-	diabetes
4	57	36/ 46	dist./mes.	+	14	7.8±6.6	36.6±20.4	-	+	diabetes
5	46	13/ 23	distal	+	16	9.2±6.7	32.4±10.3	-	-	-
6	36	33/ 45	dist./mes.	+	13	11.9±13.0	22.9±16.7	+	+	-
7	41	35/ 44	distal	+	14	3.3±1.9	17.9±9.9	-	+	-
8	32	25/ 15	mesial	+	13	1.9±2.6	19.6±9.2	-	+	-

Tab. 4: Patient characteristics

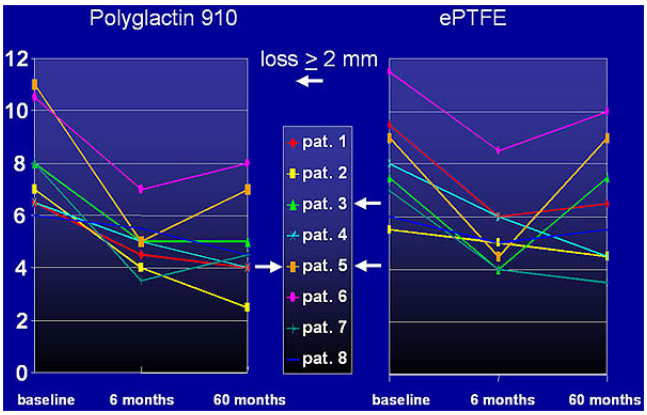

Fig. 1: CAL-V at baseline, 6, and 60 months after surgery

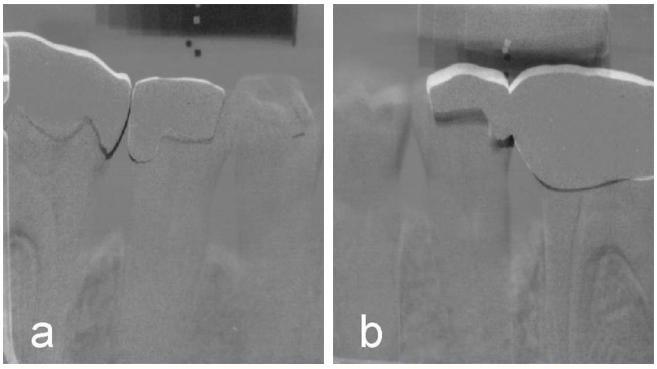

Fig. 2 a+b: Subtraction image of baseline and 60 months radiographics of patient #7 showing bony fill at the distal aspects of tooth 44 (a) and 35 (b)

This Poster was submitted by PD Dr. Peter Eickholz.

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Poster Faksimile:

2287 Long-Term Results of Guided Tissue Regeneration Therapy with Non-Resorbable and Bioabsorbable Barriers. II. Infrabony Defects

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Objectives: The aim of this 5 year follow-up study was to evaluate clinically and radiographically the long-term results after GTR therapy of infrabony defects using non-resorbable and bioabsorbable barriers. **Methods:** In 32 patients suffering from advanced periodontitis 37 pairs of contralateral infrabony defects were treated. Within each paired one defect received a non-resorbable (ePTFE; control C) and the other a bioabsorbable (Polyglactin 910; test T) barrier by random assignment. At baseline, 6 and 60±3 months after surgery clinical parameters and standardized radiographs were obtained. Using digital subtraction analysis gain of bone relative density change (mean grey level change x area) within infrabony defects was assessed. **Results:** Eight of 32 patients were available for the 60-months re examinations. 5/6 and 6/6.3 months after GTR therapy statistically significant ($p < 0.05$) vertical attachment (CAL-V) gain was observed in both groups (C/6: 3.0±1.7 mm; C/60: 3.4±1.5 mm; T/6: 3.0±0.7 mm; T/60: 4.9±1.8* mm). However, 60 months after GTR therapy 2 infrabony defects in the control group had lost all the attachment that had been gained 6 months after GTR therapy and a clinically relevant but statistically insignificant mean CAL-V loss of 1.8±2.1 mm was observed from 6 to 60 months. The study failed to show statistically significant differences between test and control regarding CAL-V gain 60 months after surgery. Also subtraction analysis failed to reveal statistically significant differences regarding density gain between both groups 6 and 60 months postsurgically (C/6: 26.4±54.2; C/60: 62.8±112.7; T/6: 68.7±72.8; T/60: 84.1±83.6). **Conclusions:** CAL-V gain achieved after GTR therapy in infrabony defects using both non-resorbable and bioabsorbable barriers was quite stable after 5 years in 14 of 16 defects.

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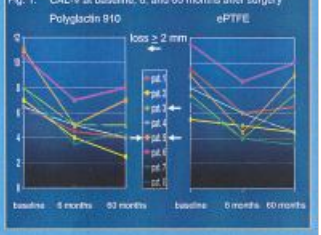
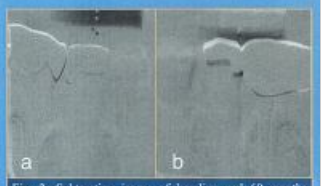
Results II

Fig. 1: CAL-V at baseline, 6, and 60 months after surgery





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7	41	35/ 44	distal	+	14	3.3± 1.9	17.9± 9.9	-	+	-
8	32	25/ 15	mesial	+	13	1.9± 2.8	19.6± 9.2	-	+	-

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