Long-term clinical outcome and morbidity factors after intraoral onlay grafting from the anterior-superior iliac crest

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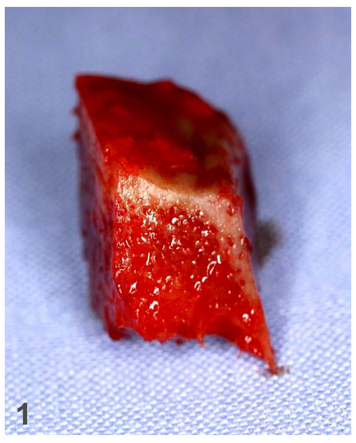
Background: Reconstruction and prosthetic rehabilitation of patients presenting severely atrophied alveolar ridges or critical size bone defects of the facial skeleton remain a clinical challenge. Long-term studies concerning dental implants placed in iliac onlay grafts exist, but an evaluation of the peri-implant bone level is rare. In addition, prospective studies regarding bone graft removal from the anterior iliac rim are lacking.

Purpose: Clinical long-term outcome was analyzed after dental implant placement in onlay grafts from the iliac crest. Additionally morbidity was evaluated and influencing factors were identified.



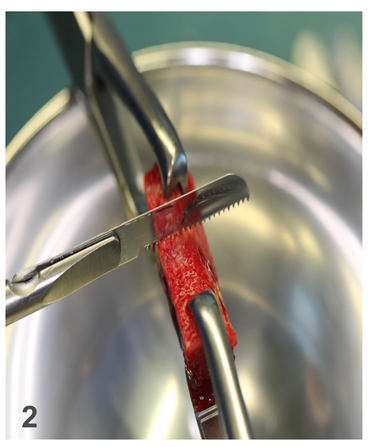


Fig. 1. Harvested corticocancellous iliac graft with two curved cortical walls and a cancellous internal part
Fig. 2. Conditioning the size and contour of the onlay graft using an oscillating surgical saw
Fig. 3. Mixture of iliac cancellous bone and deminieralized bovine bone particles (BioOss, Geistlich AG, Switzerland) (50:50)

Material and methods: A total of **52 patients**, partially edentulous or edentulous, with a mean age of 53.12 years (range 20-78 years) and a remaining bone volume of less than 5 mm of the alveolar ridge underwent **iliac onlay bone grafting** (IOBG). In a two-stage procedure a total of **196 implants** (25 Steri-Oss, **130 Camlog** and 41 Straumann) were placed in the maxilla and mandible. Postoperative evaluation included clinical **implant success**, radiographic examinations to quantify crestal bone level changes as wee as **identifying factors** for **harvest-related morbidity**

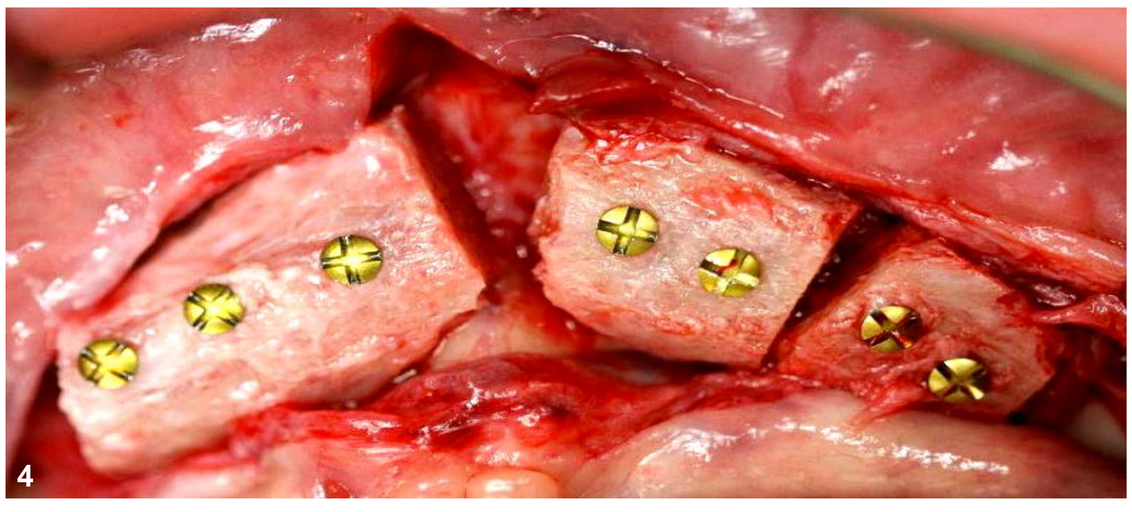


Fig. 4. In the edentulous part of jaw, corticocancellous bone blocks were fixed on the labial and occlusal aspect of the alveolar ridge, so that the cortical walls were occlusal. Each bone block was secured with multiple microscrews (Modus 1.5, Medartis, Umkirch, Germay)

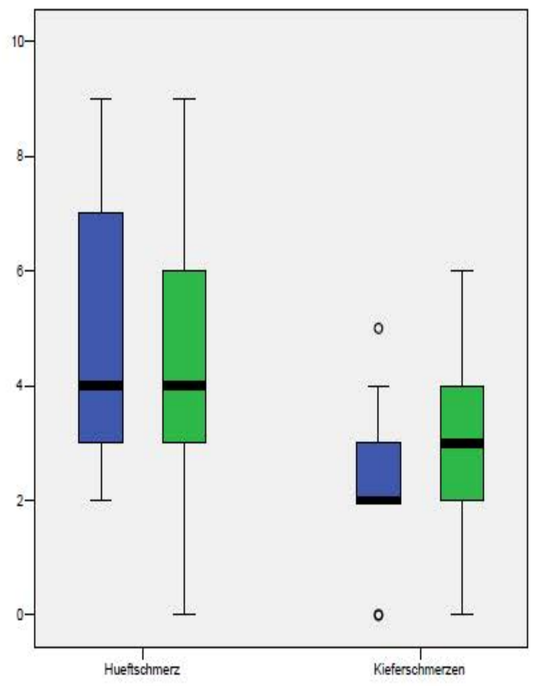


Fig. 5. Chi-square test showed no significance between age and hip pain, and age and oral pain

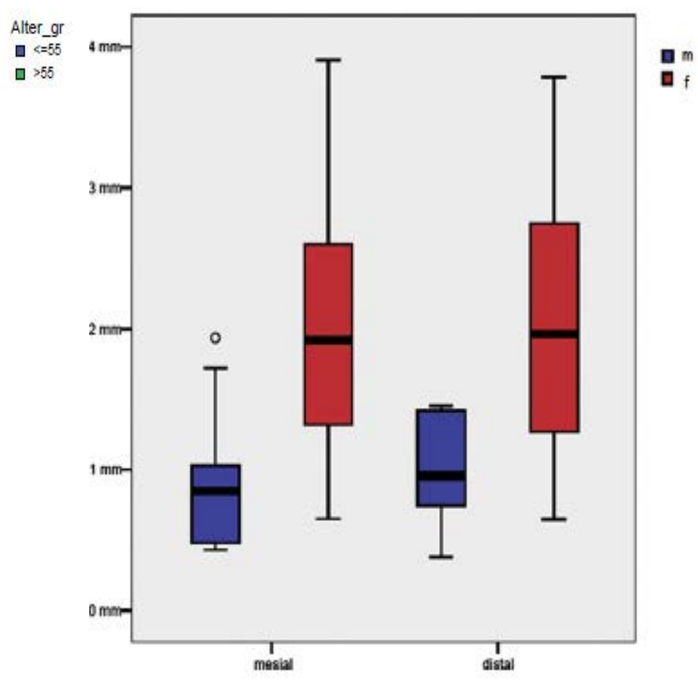


Fig. 6. Box-plot showing the significant difference of the crestal bone loss between the gender after ten years p=0.01

Results: The grafting procedure was successfully performed in all patients. Patients undergoing oral grafting show low minor postoperative complications (morbidity rate 20 %) with a high overall satisfaction rate of 95 %. A high body mass index (mean 23.34, range 18-29) was correlating with a significantly higher walking aid necessity (p=0.018). The mean amount of crestal bone loss after 10 years was 1.8 mm. There was a significant difference between gender and crestal bone loss but no influence regarding the implant system, diameter of implant and age of the patients (p<0.01).

	Bone level (mm)			
	t1	t2	t3	t4
Maxillary	0.9 (0-0.35)	1.4 (0.1-3.8)	1.7 (0.1-4.0)	1.8 (0.4-4.0)
Mandible	1.0 (0-2.2)	1.1 (0.2-2.7)	1.8 (0.5-2.9)	
Mesial	0.8 (0-3)	1.4 (04)	1.8 (0-4)	1.8 (0.5-4)
Distal	0.9 (0-4)	1.4 (0.1-4)	1.7(0.2-4)	1.8(0.5-4)

Baseline: t1, 1 year; t2, 3 years; t3, 5 years; t4, 10 years

Table 1. Data for crestal bone loss at all implants over an observation period of up to 120 months

Conclusion: Severe atrophy can be treated successfully with IOBG in combination with dental implant systems. After ten years a high success rate of 95 % and a low peri-implant bone level loss was shown. Influencing factors, e.g. gender and a high BMI, seemed to be of importance regarding bone resorption and morbidity rate.

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