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Early loading of unsplinted chemically modified dental implants in the edentulous jaw

Preliminary results of a prospective clinical trial

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Introduction

The quality of life of elderly edentulous patients can be improved using implants to support prostheses and resolve the edentulous milieu (Zarb 1983). Prospective and retrospective studies have shown that unsplinted implants used to support overdentures in the edentulous jaw are both clinically successful and economically advantageous (Mericske-Stern 1998, Buser et al. 1999, Wismeijer et al. 1999). These clinical studies have recommended a healing time of 12 weeks for implants with TPS-surfaces. Other studies on implants with SLA-surfaces have shown successful loading after a healing time of approximately 6 weeks (Cochran 2002). A chemically modified SLA-surface (SLActive) has been introduced in the Straumann Implant System. Research has shown improved bone anchorage during early stages of healing for SLActive when compared to the SLA-surface (Ferguson et al. 2006). Implant success and survival data indicates that altered loading protocols may exert only limited effects on treatment outcomes and are rarely associated with an increase in negative observations. Early functional loading of unsplinted implants with attachment overdentures may become more widespread as a simplified and efficient treatment option for edentulous patients. Prospective trials on unsplinted, SLActive implants supporting and retaining overdentures in the edentulous jaw are now required to evaluate this simple and cost-effective approach.

Objectives

This study was designed to evaluate early loading of unsplinted dental implants characterized by a chemically modified SLA-surface (SLActive), when used to support overdentures in the edentulous jaw.

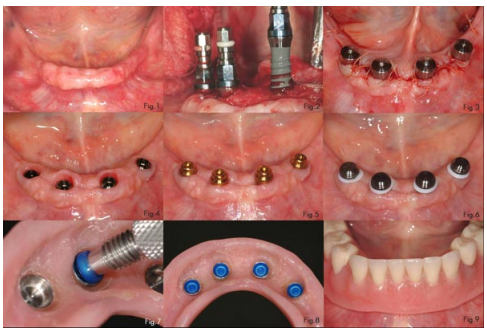

Fig.1-9 Early loading of four SLActive implants in the edentulous mandible with Locators

Material and Methods

Eight patients with edentulous mandibles and/or maxillas received between 2 and 4 solid screw titanium implants (n=26). The implant were placed using a standardized non-submerged (one-stage) surgical protocol (Fig.1-3). The implants were characterized by a chemically modified surface (SLActive, Straumann Dental Implant-System, Straumann AG, Basel, Switzerland). The patient's prostheses was not worn in the week immediately subsequent to implant placement. After one week of healing a tissue conditioner (Coe Soft, GC, Alsip, USA) was applied to the appropriately relieved intaglio of the denture. Throughout the remainder of the healing period new complete removable prostheses were fabricated for all patients. For six of the patients the opposing prosthesis was a newly fabricated complete denture. The remaining two patients received newly fabricated removable partial prostheses. Mean healing time was 45 days subsequent to implant placement. After healing Locator abutments (Straumann Dental Implant System) were positioned (n=18 mandible and n=8 maxilla) and torqued to 35 Ncm (Fig.4-6). The torquing of one implant resulted in pain (maxillary implant). For this implant torque was limited to 15 Ncm. This abutment was definitively torqued to 35 Ncm at the following appointment. Locator attachments were placed on each abutment and picked up individually in the denture (Fig.7-9). Radiographs were taken and assessments (implant mobility, implant success criteria, peri-implant probing measurements, plaque index, sulcus bleeding index, oral hygiene, patients' health status and satisfaction) were made at loading and after 3 months in function.

Results

Participants were aged 56-74 years (gender distribution of 1:1) and received a total of 26 SLActive Standard Plus Implants (Straumann Implant System) with a length of 10 mm and a diameter of 4.1 mm. One participant was not available for 3 months follow-up because of emigration and was therefore excluded. The remaining 7 participants with a total of 22 osseointegrated implants were successfully wearing their prostheses at the 3-month recall. No change in concomitant medication or health status could be observed. Throughout the period of follow-up no implants were lost or considered failures. The implant survival and success rates were therefore 100% for this preliminary evaluation (Tab.1). No implant showed direct or indirect mobility. This observation is in agreement with the results of previously published studies on early loading of unsplinted SLA-implants in the edentulous mandible (Payne 2002 & 2004, Raghoebar 2003). The overall oral hygiene was slightly decreased. In 10 implants plaque (PLI 1) was detected, and in one participant soft matter with an SBI of 2 was found (Tab.2). These participants were taken into an advanced hygiene program. The patient's satisfaction was consistent (Tab.3).To date one implant abutment could not be torqued to the recommended 35Ncm in the reduced time frame. This implant was, however, torqued without incident after approximately four weeks of additional healing and remains successful. No other complications have been recorded with regard to denture function and denture esthetics. To date no evidence of bone loss associated with the healed or loaded SLActive implants exists.

Tab. 1

Observation period	Direct implant mobility		Implant success criteria / implant mobility				Indirect
	Y	N	1	2	3	4	5
loading	1	21	22				
3 months follow-up	0	22	22				

1 No problems
2 Presence of any continuous peri-implant radiolucency based on radiographic findings
3 Presence of recurrent peri-implant infection
4 Presence of continuous or recurrent pain
5 Structural failure of implant / loss of implant

Tab.1 Implant survival and success rates

Tab. 2

	Observation period			Soft tissue measurements
	loading	3 months		
Plaque Index (PLI)	22	10	0	No plaque
		10	1	Plaque recognized by running a probe
			2	Plaque seen by naked eye
		2	3	Abundance of soft matter
Sulcus Bleeding Index (SBI)	22	20	0	No bleeding
			1	Isolated bleeding
		2	2	Blood forms red line on margin
			3	Heavy or profuse bleeding
Probing Depth [mm]	22	19	<3	
		3	3	

Tab.2 Periodontal parameters

Tab. 3

	Observation period	Patient satisfaction					
Comfort	loading	3	Excellent	4	Good		Fair
	3 months	3		4			
Appearance	loading	3	Excellent	3	Good	1	Fair
	3 months	3		2		2	
Ability to chew	loading	2	Excellent	3	Good	2	Fair
	3 months	2		4		1	
Ability to taste	loading	2	Excellent	4	Good	1	Fair
	3 months	2		4		1	
General satisfaction	loading	3	Excellent	3	Good	1	Fair
	3 months	3		3		1	

Tab.3 Patient's satisfaction

Conclusions

Within the limitations of this pilot study results suggest that the early loading of unsplinted, chemically modified surface implants, results in implant and prosthesis survival rates comparable with existing literature when considering treatment of the edentulous jaw.

This Poster was submitted by Dr. med. dent. Arne F. Boeckler.

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Implant success and survival data indicates that altered loading protocols may exert only limited effects on treatment outcomes and are rarely associated with an increase in negative observations. Early functional loading of unsplinted implants with attachment overdentures may become more widespread as a simplified and efficient treatment option for edentulous patients. Prospective trials on unsplinted, SLActive implants supporting and retaining overdentures in the edentulous jaw are now required to evaluate this simple and cost-effective approach.
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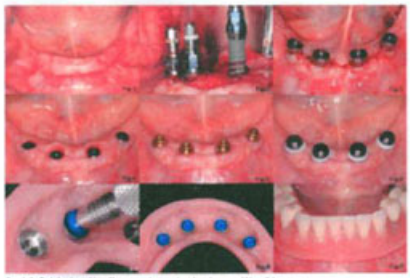

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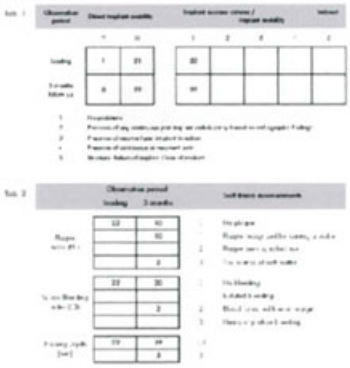

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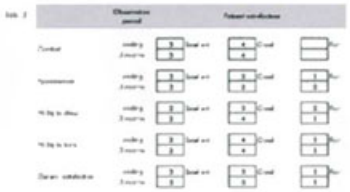

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