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Corticobasal Implants with Immediate Loading: A Systematic Overview

Dr.Girija R Giri,Dr. Apoorva.D.G, Dr. Bindu S Patil, Dr. Jyothi Patil
MDS Department of Periodontology, HKE's SN Dental College Kalaburagi Karnataka- 585105
MDS Department of Periodontology, HKE's SN Dental College Kalaburagi Karnataka585105
MDS Department of Periodontology, HKE's SN Dental College Kalaburagi Karnataka585105
MDS Department of Periodontology, HKE's SN Dental College Kalaburagi Karnataka 585105

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ABSTRACT:
BACKGROUND:Basal implants are used in atrophic jaws to establish the bone-implant-prosthetic system (BIPS).
PURPOSE: To assess the role and effectiveness of cortico-basal implants in the rehabilitation of patients in the maxilla or in the mandible with immediate loading protocol.
MATERIALS AND METHODOLOGY: A Medline search was conducted to identify studies concerning CORTICO BASAL dental implants published between 2020 - 2023. The articles included in this study, report the data including the type of study, implant type, location in jaws, observation time, prostheses, and complications.
RESULTS: Based on the inclusion and exclusion criteria, the following 5 studies were included. The success rate was found to range from 95.6% - 100%.
Keywords: corticobasal, implants, basal, BECES.

I. INTRODUCTION:

Edentulous patients have traditionally received removable complete or partial dentures to restore function and aesthetic appearance. [1]

However, the use of removable prosthesis may lead to a sense of insecurity in patients, thus reducing the capacity to chew and taste, leading to low self-esteem. Prosthetic rehabilitation aims at the restoration of missing teeth and recreating a healthy smile.

Conventional implants have certain limitations depending on the quality and quantity of available bone (width and height), adjacent anatomical areas, etc. These implants mostly achieve their stability from the crestal bone, but these areas are less dense in nature and are the primary site prone to infection.

These were not advised in moderately or severely atrophied ridges as it might lead to infection and failure of implants if the proper surgical protocol is not followed.

Bone grafting procedures may increase bone availability, complications may occur, such as graft infection or resorption, and donor site morbidity [2]

To overcome these issues, Dr. Jean-Marc Julliet developed the first single-piece implant in 1972. In the 1980s, Dr. Gerard Scortecci introduced an improved basal implant of disk type with its own set of cutting tools. Later, Dr.StefhenIdhe in 2005 introduced bending areas in the vertical shaft[3]

Rehabilitation in patients with severely atrophied ridges with a fixed ceramic prosthesis which was earlier considered an impossible task even with the use of conventional implants is now possible with basal implants.[4]

Corticobasal implants are implants that are Osseo-fixated in cortical bone areas with the intention of using them in an immediate loading protocol

In corticobasal implantology, osseointegration on or under the first cortex is neither crucial nor necessary for the functioning of the bone-implant prosthetic system [5]

It has been used in patients with severely atrophic residual ridges, eliminating the need for bone augmentation [6,7,8] . Basal Cortical Screw implants are characterized by a long smooth vertical shaft advocating their use with susceptible biological advantages. [9,10,11]

Different parameters have been used to evaluate the success and survival of the implants. **Albrektsson et al** defined a successful implant as immobile with no peri-implant radiolucency and less than 0.2 mm of annual crestal bone loss after the first year. (12).

Papaspyridakos et al. listed the parameters most commonly used to evaluate implant success which were pain, implant mobility, discharge, peri-implant bone loss or radiolucency, paresthesia, bleeding, technical and prosthetic complications, pleasing aesthetics, mastication, and satisfaction. (13)

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II. MATERIALS AND METHODOLOGY:

Studies to be included in this structured review had to fulfil the following inclusion criteria:

1. Implant survival rates were either clearly indicated or calculable from data reported in the paper or as a percentage basis.
2. In-vivo human studies were included.
3. Irrespective of the systemic health of the patient.
4. Relevant data on the number of implants, site, the type of implant, and complications if any.
5. Free articles.

III. RESULTS:

A Medline search was performed to identify clinical articles published between 2020 and 2023. The following search terms were used: dental/oral implant, basal dental implant, corticobasal implant, single-piece implant, and immediate loading. The data obtained from each article is divided into the following tables:

Table 1: included the (type of study, the number of implants, and the site) :

Author/year	Type of Study	No of implants	Site
Ashish Chakranarayan et al 2020 (14)	Longitudinal observational study	265	full mouth rehabilitations, segments, and single tooth loss
Fadia Awadalkreem et al 2022 (15)	Prospective observational study	174	Maxilla and mandible
Ashish Chaturvedi et al 2022 (16)	Prospective observational study	50	Maxilla and mandible
Shaymaa M. Warda et al 2020 (17)	Prospective observational study	13	Maxilla
Fadia Awadalkreem et al 2020 (18)	Observational study	49	Maxilla

Table 2: Included the type of implant, follow-up, and the success rate

Author / year	Implant type	Follow up	Success rate
Ashish Chakranarayan et al 2020 (14)	Strategic corticobasal BECES implants	-	97.7%
Fadia Awadalkreem et al 2022 (15)	3.5–4.5 mm, and a length of 10–23 mm BCS® implants	18 months	100%
Ashish Chaturvedi et al 2022 (16)	BCS implants	6 months	95.6%
Shaymaa M. Warda et al 2020 (17)	Rootт basal dental implant, TRATE AG, Swizerland, lengths (10, 12) mm and diameter (3.5, 4.5) mm	6 months	100%
Fadia Awadalkreem et al 2020 (18)	(BECES® Brand, Manufacturer Simpladent GmbH, CH-8737, Gommiswald, Switzerland	18 months	100%

Table 3: included the type of impression material, systemic condition of the patient and surgery method

Author/year	Impression material	Systemic condition of the patient	Surgical method
Ashish Chakranarayan et al 2020 (14)	addition silicone impression material	Diabetes, Hypertension, Heart disease	1:1 torque and 20000 rpm were used to drill the osteotomy
Fadia Awadalkreem et al 2022 (15)	monophase [vinyl polysiloxane impression (VPS); IvoclarVivadent AG]	Systemically healthy	flapless approach

Ashish Chaturvedi et al 2022 (16)	addition silicone impression material	Systemicallyhealthy	flapless
Shaymaa M. Warda et al 2020 (17)	-	Systemically healthy	Atraumatic extraction followed by rasing of mucoperisosetal flap
Fadia Awadalkreem et al 2020 (18)	monophase vinyl polysiloxane (IvoclarVivadent AG, Schaan, Liechtenstein).	Systemically healthy	standard one-stage surgical procedure

IV. DISCUSSION:

This review presents a comprehensive view of basal implants from 2020 to 2023. In the present study, data on basal implants from 05 studies ie. Observational studies are presented. In this study, basal implants were reviewed from 2020 to 2023 by dividing the data into three tables, and the description of each study is as follows:

in the first longitudinal study conducted by **Ashish Chakranarayan et al in 2020** (14) 265 BECES single-piece, polished surface, bendable implant implants were placed for full mouth rehabilitation, segments, and single tooth loss in patients with diabetes hypertension, and heart diseases. 06 implants failed and had to be removed from the patient's mouth, with a success rate of 97.7%. no later Follow up was done. There was no mention made regarding the dimensions of the implant.

In another prospective study, conducted by **Fadia Awadalkreem et al in 2022** (15)174 implants with dimensions of 3.5–4.5 mm, and a length of 10–23 mm BCS® implants were placed in the maxilla and mandible with a follow-up of 18 months with a success rate of 100% in systemically healthy patients.

In a prospective study, conducted by **Ashish Chaturvedi et al in 2022 (16)**93 BCS implants were placed in the maxilla and mandible and no note was made regarding the dimensions of the implants in systemically healthy patients. A follow-up was done for 6 months with a success rate of 95.6%.

In another prospective observational study, conducted by **Shaymaa M. Warda et al in 2020 (17)** 13 Root basal dental implant with lengths (10, 12) mm and diameters (3.5, 4.5) mm was placed in the maxilla and mandible. Follow-up was done at 6 months with a success rate of 100% in systemically healthy patients.

In an observational study, conducted by **Fadia Awadalkreem et al in 2020 (18)** 49 (BECES®) dental implants were placed in the maxilla with a follow-up of 18 months and a success rate of 100%. No note was made on the dimensions of the implants. Forty-five implants protruded into the sinus cavities conclude that protrusion of a BECES® implant into the nasal or maxillary sinuses does not compromise the success or survival rate of the implant nor the health of the sinuses. Both the implants and the peri-implant soft tissues in this study were deemed to be in excellent health. It can be concluded from the literature that if polished implant tips penetrate into the sinus or trespass, this does not initiate sinus infections nor propagate or prolong such infections.

All the implants placed in the studies mentioned above followed immediate loading protocol.

V. CONCLUSION:

This structured review has identified 05 articles, among which the basal implants were placed with immediate loading protocols in atrophied ridges which showed a good success rate. A longer follow-up is needed to assess the condition of the basal implants in later stages.

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