



Clinical Results summary Dyna Helix Implant

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Survival of Dyna implants: a retrospective study with 1 to 4 years follow up

abstract

Dental implants are a prominent scientific breakthrough and are frequently applied for the reconstruction of missing teeth. From the clinician's point of view, long-term studies are essential to find out the predictability of the implant system. In this retrospective investigation, 1106 patients who underwent 2726 Dyna implant treatments in a private office between 2013-2017 were included. The present study has shown that the Dyna dental implant has high implant survival, low marginal bone loss and it has all success and survival criteria similar to world class dental implant systems.

introduction

Dental implants are a prominent scientific breakthrough and are frequently applied for the reconstruction of missing teeth. [1-2] After discovering osseointegration by Brånemark and the placement of the first implant 50 years ago [3-4], implants are being used in dental offices for the rehabilitation of edentulous or partial edentulous. [5] Several recent studies reported 90% and 98.8% survival rates after 10 years follow up [6-9] and even 100% survival rate after 12 years [10]. Due to the high success rate and improvement in the quality of life of patients, today implants are an ideal treatment for replacing missing teeth[11]. Nowadays, more than 100 implant systems varying in diameter, shape, material, surface properties, length, and geometry are available on the dentistry market [12-14].

The Dyna Helix implants are cylindrical screw-type implants based on a root shape core and a straight self-tapping thread, and they are made with medical Titanium grade 5. The DC (bone level) implant is a tripartite cylinder screw with a root form, dual-core self-tapping thread. The ST (bone level) implant is a dual cylinder screw with a root form core with a self-tapping thread up to the neck of the implant and the TM (tissue level) implant is based on root form core with self-tapping thread up to the bone level area of the implant. The basic design of the Dyna Helix TM implant corresponds to that of the Dyna Helix ST implant.

From the clinician's point of view, long-term studies are essential to find out the predictability of the implant system. Hence, the aim of this uni-center study is the long-term evaluation of the Dyna implant system between 2013-2017.

Material and method

In this retrospective investigation, 1106 patients who underwent 2726 Dyna implant treatments in a private office between 2013-2017 were included. All patients were systematically healthy. Smoker, pregnant woman and patients with mental disorder were excluded from the study.

All patients allowed their data to be used in the study and they signed a written consent form. Of the 1106 patients, 457 males (43%) and 631 females (57%) received treatment.

A total of 1379 implants (50.58%) were placed in the maxilla, 1374 implants (49.42%) were placed in the mandible, 815 (29.8%) were placed in the anterior region and 1911 (70%) were placed in the posterior region.

According to Table 1 and 2, the 3.6 mm implant diameter was used more than the other implant diameter and 11.5 mm implant length was used more than the other length.

Table 1. Distribution of implant diameter in patients

Implant Diameter	Number of patients	Percentage
3.2	165	6%
3.6	1458	53%
4.2	1.31	38%
5	72	3%

Table 2. Distribution of implant length in patients

Implant length	Number of patients	Percentage
8	268	10%
10	617	23%
11.5	921	34%
13	844	31%
15	76	2%

Table 3 shows the type of implant used in this study. Bone level DC implants were used more than the other types.

Table 3. Distribution of implant type in patients

Implant type	Number of patients	Percentage
ST	938	34%
DC	1304	48%
TM	486	18%

Assessment of marginal bone loss and failure of the implant were done by a professional periodontist. The following variables were analyzed: implant length, implant diameter, implant location, implant bone loss, and implant failure.

Results

Dyna implants (2726) done from 2013 to 2017 were evaluated in this study. Ninety-four implants failed during healing time or recall visits (survival rate=96.5%). Wider implants have the least failure (1%) and failure in 3.6 diameter implants is prevalent (58%), as is shown in Table 4. Increasing implant diameter reduced implant failure.

Table 4. Failure distribution according to implant diameter

Implant diameter	Number of failure	Percentage
3.2	11	12%
3.6	54	58%
4.2	28	29%
5	1	1%

According to implant length (Table 5), failure is prevalent in 15 mm implants but this difference is not meaningful and it seems implant length is not dependent on implant failure.

Table 5. Failure distribution according to implant length

Implant length	Number of failure	Percentage
8	9	10
10	18	19
11.5	37	40
13	28	30
15	2	1

According to the implant type (Table 6), 55% failures occurred in the DC type following by TM (22%), and the least failure was observed in ST (22%).

Table 6. Failure distribution according to implant type

Implant type	Number of failure	Percentage
ST	20	22%
DC	51	55%
TM	23	23%

This study has shown that parallel implants (ST type) have a better prognosis and marginal bone loss has been significantly higher in tissue level implants. Implant failure in posterior sites is two times more than the anterior sites; however, no differences were seen between the maxilla and mandible.

Discussion

The aim of this retrospective study was to evaluate Dyna implant survival and failure rate, and the factors affecting this condition. This study has shown that the Dyna dental implant system has all success and survival criteria similar and comparable to world-class dental implant systems. The current study has shown a 96% survival rate and less than 1 mm bone loss after four years of follow up.

Several conditions may affect implant failure and survival, including anatomical location (maxilla or mandible), implant dimension (diameter and length) and implant type (bone level or tissue level). With regard to implant diameter, we have concluded increasing the implant diameter leads to reduced implant failure. Some of the literature showed narrow implants had 3.94 times more failure rates than wider implants [15-17]; however, some studies showed narrower implants had similar survival rates to standard implants. [18-20]

There are several factors, excluding implant diameter, that affect the survival rate of narrow implants such as the type of the bone and time of loading. Since narrower implants are usually applied in compromised areas such as the narrow ridge [21], case selection is very important in narrow implant survival rate. Moreover, increasing the implant diameter leads to reduced stress and strain on the jaw bone especially in the alveolar crest [11] and may lead to less failure.

Another factor that may affect implant survival is implant length. In our study, there were no differences between implant failures regarding implant length changes. Hence, we have concluded that implant failure is not dependent on implant length. The concept of the relationship between short implants and the rate of failure is still contested [22]. Some studies showed shorter implants led to more failure [15, 23-24]. In contrast, other studies showed that there was no correlation between implant length and failure [25-27].

Moreover, we have concluded DC implants are very good for immediate loading and soft bone and trans mucosal implants are better for overdentures and the non-esthetic zone.

In the current study, implant failure is more prevalent in the posterior than anterior region; however, there are no differences between the maxilla and mandible. There is a controversy about the location of the implant and implant failure. Some studies showed a low survival rate in the maxilla [28][29], but other studies showed that implant failure was independent of the region of implant placement [30]

One important criterion for implant follow up is changes in the marginal bone level [31] and the preservation of the crestal bone is critical for implant success [32]. The dental community has accepted a loss of 2 mm of marginal bone after loading during the first year. Moreover, after one year, tissue stability is essential for implant success and more than 0.2 mm bone loss after one year is undesirable. [31] In our study, marginal bone loss is less than 1 mm after four years of follow up, and this bone loss is in accordance with implant success.

Conclusion

The present study has shown that the Dyna dental implant has high implant survival, low marginal bone loss and it has all success and survival criteria similar to world class dental implant systems.

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