Translation

W. Knöfler [1], A. Knöfler [1], H.-L. Graf [2]

[1] Rietschelstr. 27, 04177 Leipzig, Germany
[2] Clinic and Policlinic for Oral and Maxillofacial Surgery, University of Leipzig, Nuernberger Str. 57, 04103 Leipzig, Germany

Survival analysis of implants in a dental office over a period of 10 years

Published in ZZI, Zeitschrift für Zahnärztliche Implantologie (2004;20(4), Deutscher Ärzte-Verlag, Cologne, Germany

Survival analysis of implants in a dental office over a period of ten years

The study comprises 463 patients (271 females with 674 implants and 192 males with 535 implants) who received a total of 1209 implants during the period of June 1, 1992, to June 30, 2002. The survival rate was determined using the Kaplan-Meier method.

The analysis includes the influence of implant type, implant site, indication class, the surgical environment, the type of prosthetic construction and the combination of implants and teeth. In relation to the implants, the chance of survival after ten years was found to be 88%, in relation to the patients 81%. Start of risk was the implant insertion. The result showed, however, that the implant site and augmentation methods did not reduce the success rate, and there was no difference between maxilla and mandible, but regarding the design of the prosthetic construction.

Key words: implant insertion, dental; survival rate, prosthetic construction

1 Introduction

The details for survival rates of implants has changed significantly during the past 30 years. Tetsch (47) stated in 1977 that after a period of seven years up to 40% of failures (33 to 70%) or mishaps occured with implants. With improvement of the methods and materials the survival rate increased, and the introduction of defined statistical methods facilitated the comparability (3, 23, 29), as confirmed in 2001 by the consensus statement on the survival of implants of DGZMK and DGI (41).

Haas et al. (19) found (in 1986) a success rate of 89.9% of 1,920 IMZ implants after 60 months, and 83.3% after 100 months, while for the maxilla the rate was considerably lower with 71.6% or 37.9% resp.

The numerous publications on survival rates of Branemark implants during the years of 1988 to 2000 showed survival rates of 92.8% and 100% (1, 2, 6, 8, 20, 21, 22, 24, 25, 26, 33, 34, 35, 39, 42, 48). The lower rate resulted from a multi center study with 3,683 implants (1), while the lower rate related to smaller groups as for instance with single tooth replacement (21).

For ITI implants, the survival rate after 8.4 years was 77.4% (5, 11, 31).

Jahn and d'Hoedt (23) used the analysis method of Cutler-Ederer and Kaplan-Meier for the Frialit-I implant in 1992 and found a rate of 62% (K-M) or 63% (C-E) resp. after ten years. Fichtner et al. (14, 15) determined a survival rate of 85.7% for blade implants after ten years.

Over the past few years to the present, the results increased gradually and have reached a level of approx. 85 to 95% after ten years (5, 9, 10, 12, 13, 16, 17, 18, 19, 21, 31, 32, 38, 37, 40, 45).

The data of the authors which are based on more than 1,000 implants, are illustrated in Table 1. The survival rates after five years are at approx. 90% and after ten years at approx. 80% (Figure 1). The data in literature which are based on an input-output analysis, regularly show higher success rates than the survival statistics of other authors. The graphics demonstrates this difference by the curve of regression which is based on a linear relation (correlation coefficiency 0.946).

Figure 1 Survival rates of implants in the literature based on input-output statistics and survival rate analysis

(Table): Success rates in literature over an observation period of 16 years

Table 1 Results of studies involving more than 1,000 implants – as found in the literature
Authors, year, indication, system, patients, number of implants, failure, success, survival rate, observation period (years)

The results found in the literature were similar between the individual implant systems, except for the Frialit I implants made of Al_2O_3-ceramics which showed a different start situation due to the use as immediate post-extraction implant (Figure 2 to 6).

Approx. 60% of the authors used the Kaplan-Meier statistics method, and very few used the method of Cutler-Ederer, and even less followed the recommendations of DGZMK/DGI (41) for preparing such analysis studies.

The studies stated unanimously that approx. 2 to 3% of the implants failed during the healing period, five years later there are between 87 and 97% (M = 91.9%) in function, after ten years between 68.6 and 91.2% (M = 79.9%), and after 15 years only 76.3%. The input-output data showed a noticeable overrating with 95% after five years and 90% after ten years.

2 Patient data

The observation study of the authors comprise all patients who received implants in the dental clinic during the period of June 1, 1992, to June 30, 2002. A total of 463 patients received 1,209 implants. Of these patients were 271 females who received a total of 674 implants, and 192 males with 535 implants.

Figure 2-4 Survival rates of different implant systems in the literature

The above deviates considerably from the statical significance of equal gender distribution ($p < 0.001$, Chi^2-Test). Considering the number of cases, the relatively higher number of femals patients has to be regarded as significant for the statistics. However, this unequalness does not have a significance exceeding this fact.

The average age of the female patients at the time of implant insertion was 48.85 years, that of the males 48.99 years. The average of implants inserted was for the females 2.54, for the males 2.79 implants. The age of the patients is illustrated in the following grafics.

3 Parameters

The evaluation included information on personal data of the patients, implant type and size, indication class, insertion site, conditions at surgery, complications, choronologic data of the treatment, type of prosthetic restoration and date and origin for implant failure:

Name, first name, date of birth, implant type, implant length, implant diameter, implant insertion site, indication class (single tooth, tooth group replacement, reduced remaining dentition, edentulous), date of implant insertion, date of re-entry, date of insertion of the prosthetic restoration, type of the superstructure, type of augmentation, date of implant failure, original of failure, date of the last check-up.

Table 2 Overview of explorative statistical methods used

Test	Objective
Mann-Whitney-U-Test , (Sachs, 1992)	Comparison and evaluation of the differences between two groups in parameters which contain fixed data
Chi^2-Test, Fisher-Yates Test (Bortz, 1990)	Evaluation of differences at frequency (e.g. control if differences exist in percentage)
Method according to Kaplan and Meier (Kalbfleisch et al. 1980)	An analysis procedure for probability of an occurrence (failure) and description of the course of the occurrence. The occurrence can be interpreted only in conjunction with the time aspect (the tendency of occurrence)
Regression according to Cox (Cox, 1984)	Multi-variable process for determining the predictability of a risk including the time aspect of occurrence tendency. The predictive parameters can be taken from a list of parameters.

The data material was documented in tables and a statistical evaluation was prepared regarding the individual aspects.

Table 3 Frequency of implant types

Implant type	Data base (number of implants)	%
total	1,207	100%

Data base: n = 1209

4 Statistical methods for the analysis of implant survival rates[1]

In order to facilitate the evaluation of data, a relational data bank was used (Microsoft ACCESS 2000, while the raw data were secured in the statistics software by ODBC driver). The statistical evaluation was prepared by using SPSS 11.0.0 as well as alternatively by SAS Version 8. In the context of the existing analyses, the following data - according to each objective – were secured:

- the frequency data secured the absolute and / or relative frequency data (% equivalent)
- for the metric data, the arithmetic values were taken as measure for the variability of the standard deviation, the minimum and maximum, the amount of cases, as well as the percentile. Percentiles which includes also the median, can be designated as fixing points of a distribution of values. For instance the median characterizes the value which divided the random sample in the center.

All statistical tests were used purely explorativelv, without exception (7, 11, 27, 43).

Figure 7 Proportion of male / female patients
males 41%, females 59%

[1] We thank Mr. Ulrich Stefenelli, Institute for Statistics, Domstr. 10, 97070 Würzburg, for the statistical evaluation.

5 Results

5.1 Implant insertion sites

The proportional distribution of insertion sites is illustrated in Figure 9. In the maxilla there is a slight overrate on the premolar and molar region as well as the upper central incisors, in the mandible the molar region and the premolar / canine region are prevailing. The failure rates in the area of the premolars and molars of the maxilla are higher than in the anterior region.

Table 4 Descriptive Statistics of the type of prosthetic restoration

Type of restoration	Data base	%
Bar on implants, cover denture, removable	214	18.7
Bridge, implant and tooth supported, cemented	193	16.9
Bridge, implant supported, screw-on	148	13.0
Bridge, implant supported, cemented	131	11.5
Bridge, implant and tooth supported, screw-on	105	9.2
a.a.m. - restoration performed at external clinic	91	8.0
Single crown, screw-on	91	8.0
Single crown, cemented	68	6.0
Ball attachment, cover denture	25	2.2
patient did not return for recall	15	1.3
Bridge, bar supported	13	1.1
Long-term temporaries, acrylic bridges	13	1.1
Telescopic prosthesis	12	1.1
Bar on implants and teeth, cover denture	9	0.8
Bridge, implant and tooth supported, telescoping	5	0.4
Second implant insertion	5	0.4
Implant as telescope under existing denture	4	0.4
total	1,142	100.0

In the mandible, the canine region is used more often. The relatively low number of implants in the different positions, if placed in conjunction with possible indication causes, would be speculative and is, therefore, not considered.

5.2 Implant characteristics

A short characteristics of the implants shows preferred diameters of 3.8, 4.5 and 5.5 mm and lengths of 13 or 15 mm resp. This choice can be attributed on one hand to the patients and existing jaw atrophy, on the other to the implant design and the predetermined sizes. In principle, the aim was to make use of the maximum available bone with the largest possible implant, considering all possibilities.

Figure 8 Histogram showing the age of the patients involved

Figure 9 Number of implants according to individual tooth positions

Figure 10 Failures of implants (%) according to the individual tooth positions

Figure 11 Cumulative survival rate of all implants, determined by a Kaplan-Meier curve (Survival rate in %, Longevity in years)

Table 5 Descriptive statistics on the survival rate of all implants

Implant status	Chances for implant survival
Cases, failures, no failures, %, average longevity in years (censured cases considered)	

5.3 Implant types

The most frequently applied implant was the Frialit II (28%), followed by blade implants (17%) and ZL implants (14%). Table 7 demonstrates the information on the implant types applied.

5.4 Type of prosthetic restoration

The most frequently used type of restoration was the bar on implants with removable cover denture (18.7%), followed by a bridge, implant and tooth supported, cemented (16.9%) and a bridge, implant supported, screw-on (13.0%). With several implants, the prosthetic construction was provided by a home dentists, therefore an exact categorizing could not take place. A few of the patients did not return after implant insertion for further restoration, although the implants were osseointegrated without complication.

5.5 Evaluation of survival rates of implants

5.5.1 The survival rate of the implants based on the implant type

The prognosis for implant stability was determined by the Kaplan and Meier method (11).

The total of 1,209 implants were observed in follow-up in an average (Median) of 3.63 years (this is the median longevity of implants in situ, at least < one month and maximum ten years). In total, a failure of 105 implants occurred. 1,104 implants (91%) were in situ at the start of this statistical evaluation.

The one year success rate of implants in situ was at 93% and after five years reduced to 90% (Figure 11 and Table 5). The median longevity (median evaluation considering censured, i.e. unaffected implants at the end of the observation) was just below ten years. This is remarkable and can be regarded as an underestimate, considering that this value is based on the many implants still in function at the end of the observation period.

Figure 12 Implant failures during the observation time

Table 6 Descriptive statistics regarding figure 13

Figure 13 Survival rate of implants by indication, according to Kaplan-Meier method

The input-output evaluation shows a failure of 8.685%. The Kaplain-Meier curve shows, however, that after ten years a failure rate of more than 10% is indicated. This results among others from the fact that with each failure the number of random samples is reduced and the number of losses following are categorized to the reduced number of implants.

When checking the time of failure, it becomes clear that the implant losses mainly occur during the healing phase of three to six months (Figure 12).

Most of the failed implants were removed during the healing phase. 53% of the failures occurred during the first six months, 65% during the first year. This indicates that the chances for an implant supported prosthetic construction – as far as the final placement was possible - for reaching a term of ten years in function are more than 95%.

5.5.2 The survival rate of implants according to indication

Regarding the indication, the longevity of implants in the indication group tooth group replacement / reduced remaining dentition (ZGE / RR) is correspondingly high (see the median longevity in Table 6), while with the indication of edentulous maxillary jaws the longevity is significantly reducing during the time of observance. With the indication of edentulous mandibles, the longevity at the beginning is below that of all other indications. The indication group ZGE / RR is, however, in the number of cases considerably lower (eleven cases) than other groups; this calls for corresponding caution with interpretation of this result.

Table 7 – Descriptive statistics regarding figure 14

Implant Status						Chances of Longevity of Implants			
Implant type	Cases	loss	no loss	%	medium longevity in years (censured cases considered)	1 year	2 years	3 years	5 years
Blade	205	22	183	89%	9.0 (SE 0.2, CI 95% 8.5-9.4)	95%	93%	92%	88%
Camlog	83	3	80	96%	1.5 (SE 0.0, CI 95% 1.6-1.6)	95%	--	--	--
F Synchro	67	7	60	90%	1.3 (SE 0.0, CI 95% 1.2-1.4)	89%	--	--	--
F 2	334	27	307	92%	7.9 (SE 0.1, CI 95% 7.6-8.1)	94%	93%	92%	92%
Frialoc	41	4	37	90%	2.0 (SE 0.1, CI 95% 1.8-2.2)	90%	90%	--	--
KSI	88	5	83	94%	3.5 (SE 0.1, CI 95% 3.4-3.7)	94%	94%	94%	--
Pitt Easy	92	1	91	99%	6.5 (SE 0.1, CI 94% 6.4-6.7)	99%	99%	99%	99%
ZL	171	25	146	85%	8.7 (SE 0.3, CI 95% 8.2-9.2)	91%	90%	87%	84%

5.5.3 Comparison of implant types

A comparison of the different implant types (as far as sufficient implant cases were on hand) showed advantages for the Pitt-Easy implants, while for the Frialoc and Camlog implants considerably higher failure rates and for the F-Synchro implants high short-term losses were prevailing (Table 7).

Blade and ZL implants approach each other in the survival rates after seven to ten years. Both were used in the advanced-atrophied small jaw bone.

5.5.4 Comparison of implants at different pre-operative situations

A comparison of implants with and without prior augmentation show only minimum differences in the longevity. Only just before the fifth observation year there is a slightly higher loss rate, if an augmentation was performed (Figure 15 / Table 8). This considerable reduction was caused by the unfavorable situation of a female patient. In this case, bone splitting was performed, and after insertion of blade implants in the maxilla and their overloading a loosening of the blades occurred, followed by a loss of all six implants after five years. This case was included in the different curves and is caused by this same occurrence.

Among the 1,209 implants, 264 were accompanied by augmentation methods (GBR, bone splitting, surface osteoplastic, sinus lift), 18 of them failed. This represents a rate of 6.818% at a median longevity of 3.38 years. The implants without such accompanying situations had a failure rate of 9.22% whereby the median longevity was 4.51 years. Remarkable – and contrary to expectations – was the fact that there were no significant differences between the longevity in both groups. It can be assumed that an improvement of the implant anchoring bone site by surgery can lead to a longer survival time of the implants than would have been without, if considering the results of the ZL and blade implants.

Figure 17 Survival rates of implants by different indication and location – survival analysis plotted as a Kaplan-Meier curve

Table 11 Descriptive statistics regarding figure 18

Figure 18 Survival rates of implants by length – survival analysis plotted as a Kaplain-Meier curve

5.5.5 Survival rate of implants in the maxilla and the mandible

Also a direct comparison of implants in the mandible and the maxilla (teeth 18 to 28 versus teeth 38 to 48, according to indication) acutually shows only minimum and statistically irrelevant differences in the longevity (Figure 16).

5.5.6 Differences between maxilla and mandible according to indication class

At a direct correlation of indication and localization the implants in the edentulous maxilla show a considerably higher failure rate than among the other groups, while the tooth group replacement in the reduced remaining dentition of the mandible shows the lowest loss, followed by single tooth replacement in the maxilla. The survival rate for single tooth replacement in the maxilla is higher than in the mandible, as confirmed also by the tooth group replacement. The edentulous maxilla has considerably reduced rates as compared to the edentulous mandible which, as mentioned above, can be traced back to the one unfavorable case described. For the reduced remaining dentition, the remark should be made that the number of cases was not very high (Table 10).

5.5.7 Survival rate of implants according to implant length

Concerning the length of the implants, there are no significant disadvantages. The curves are partly the same (Figure 18 / Table 11). Only after seven years there seem to be slight disadvantages for shorter implants. However, also here it should be considered that the differnces shown are not significant and caused by the number of cases in the individual groups by few occurrences.

5.5.8 The survival rate of implants according to the diameter

A comparison of the diameters shows slight disadvantages for slim implants (Figure 19 / Table 12).

5.5.9 Comparison of the types of restoration

A comparison of the types of prosthetic restorqations shows only mimimal differences regarding the success curves which are over long distances of the time axis the same. Remarkable is only that bars on implants show a slightly lower success curve (Figure 20 / Table 13).

5.5.10 Longevity according to implant site

Also a direct comparison of different insertion sites shows in general high, but only minimal differences in the success rates which can, therefore, be neglected (Figure 21 / Table 14).

5.6 The survival rate of implants according to the patients

The prognosis for implant stability was established according to the Kaplain and Meier method (11), in this special case the patients and not the implants were taken into account (the fact that the data are accumulated by patients, enables the performance of statistical significance tests).

The procedure was as follows: A minimum survival time was established for each patient. If there was no failure, the average survival time was taken as observance period.

Figure 22 and Table 15 summarize the results. There were failures with a total of 66 patients. 395 patients (86%) hat no loss so far. The 1 year rate of successful patients was 88% and decreased to 85% after five years. This rate is slightly lower than in the evaluation which was based on the number of implants as data base. The medium longevity (median value evaluation under consideration of censured, i.e. implants without occurrence at the end of the observance.) was at slightly more than eight years (8.5; SE 0.2, CI at 95% 8.2 to 8.9). It should be mentioned that also this value represents rather an underestimate due to the many implants which were without failure at the end of the observance.

5.7 Multivariable results - use of several predictors simultaneously for the prognosis of the implant loss risk

A final evaluation concerns the question as to which of the available predictors are predictive for longevity prognosis. Assuming that the failure dispositions of the individual implants would not correlate, a regression according to Cox was performed on an explorative basis (n = 1209). The results are documented in Table 16. The results allow the following conclusions:

Female patients have a significantly lower relative failure risk (p = 0.006, by the factor 0.749 in the 95% confidences of 0.609 to 0.922), i.e. the implant failure risk is 21% lower with females, as the risk is lower than the factor 1 (= no change in risks), (1-0.749 = 0.251) which corresponds with a decrease of 25.1%).

Also the loss risks with bridges, single crowns and bars are significantly lower (see the p-values marked in bold in the third column and the risk coefficients in the third last column in Table 16).

There were no additional signs for higher risks which would be statistically significant (see the p-values conlumn in Table 16).

6 Discussion

The observations of the authors comprise a number of 1,209 implants with 461 patients. This study is in the range of corresponding reports in literature. Twelve studies were found which concern more than 1,000 implants (1, 9, 10, 13, 18, 19, 37, 40), among others. The statistical methods in these studies were similar or are comparable to the requirements of DGI regarding this subject. The survival rates of implants reported in the literature averaged with 90% after five years and 80% after ten years observance. In the own studies the authors established all patients with implant failure as failure, and survival rates of 85% after five years and 81% after ten years were ascertained. The curve in Figure 22 indicates that most implants were lost during the healing time, while during the later time there were considerably less failures. When considering the total number of 1,209 implants (Figure 11), the survival rate after five years is 90%, and after ten years at 88%. It may be assumed that the true rates are even 1 to 2% higher. This can be based on the fact that the losses reported are caused by the actual size of the random samples which is lower at the end of the observance by patients no-show.

Contrary to reports in the literature (18, 19, 21) the authors ascertained in their study that the insertion site of the implant did not influence the survival prognosis (Figure 16 and 21). There were no differences between maxilla and mandible and between the typical insertion sites such as mandibular molar position, interforaminal region and maxillary anterior region. Dietrich et al. (13) found in 1993 a difference of 18% between maxillary and mandibular positions.

The distribution of implants between the tooth positions (Figure 13) shows a participation of all tooth positions with a certain preferrance of the lower six position and „discrimination“ of the upper positions seven or eight. At the site of lower wisdom teeth no implants were inserted. The position of the anterior upper teeth seems to show a higher survival rate (Figure 29), although the curves cannot demonstrate any significant differences, as opposed to reports of Haas et al. 1986 (18). However, the indication class, i.e. the loss situation at the beginning of the restoration, seems to have a considerable influence on the prognosis (Figure 13). The single tooth replacement and that of tooth groups (free-end gaps / interdental gaps) show a similar final result regarding the prognosis, and the survival is remarkably higher at reduced remaining dentition, while that of the edendulous is considerably below. It is obvious that the number of inserted implants or the completion of the remaining dentition plays a decisive part. With the group ZGE / RRG the patients with only a few remaining teeth received

so many implants that fixed cemented or fixed-removable bridges could be placed resulting in a mutual splinting. The single tooth implants were - as their name indicates - integrated into the remaining nearly complete dentition.

Kirsch and Ackermann (28) represent the concept of tooth by tooth reconstruction and claim a high survival rate of 93% after ten years (40). This may be attributed to the minimized loading of the individual implants.

The results of the authors for single tooth replacement show failures in the early phase, but later nearly no loss (Figure 13, 17), the loss in the mandible was initially nearly 10% higher. The indication classes of the edendulous maxilla and mandible resp. showed the lowest survival rate. Remarkably the curves for the single tooth replacement and the edentulous mandibles are nearly the same, the edentulous maxilla shows even higher rates up to the fifth year, and then decreases with a final horizontal straight line (no more failures). This clear decrease is caused by one female patient who received three blade implants in very weak anchoring bone and three 2.9 mm ZI implants which had to be removed after five years in another dental clinic. With a total of 87 implants in this indication class, this result is significant accordingly. Had this misindication not been included in the evaluation, there would not have been a difference between the edentulous maxilla and mandible (Figure 13). The early reports of the Branemark group regarding maxilla and mandible cannot be taken as comparison because they are based mainly on the survival of the prosthetic superstructures.

If considering the different fixation possibilities of the prosthetic replacement on the implants, the authors have found that with their own patients the restoration type of cover denture on bar showed the lowest survival rate with 88% after ten years. The DGI (41) reported on the same subject 88 to 97% after eight to ten years.

The implant supported constructions and single tooth replacements reached considerably higher rates of 98% and 99%. The DGI/DGZMK report in their comments on the survival rate of implants and implant anchorage in 2001 (41) rates of between 92 and 98% after eight years.

The graphics in Figure 20 shows, of course, only those implants which could be restored prosthetically, i.e. the failures from the initial healing phase were not included. The consideration of the confidence interval shows, however, that there is no significant difference (Table 13). The implant supported constructions showed no lower survival rate than the tooth and implant supported restorations, which is – contrary to earlier reports – now also confirmed by the DGI in their comments.

Among the 1209 implants, 264 were accompanied by augmentative methods, including procedures such as sinus lift, the lateral augmentation, the bone splitting, bone spreading and bone condensing.

It is astonishing that the survival curve of these implants – as opposed to those which were not subjected to such augmentation methods – did not show any significant difference. If the above-mentioned case with a loss at five years would be disregarded, the curve of the augmented implants would even remain above those without augmentation. The conclusion could be made that a sufficiently improved bone site will prolong the survival of implants and augmentation should be applied in more cases than avoid an assumed risk with this method. This consideration should be contemplated in future studies even more extensively, especially because the presently valid opinion regarding augmentative methods assumes a higher healing risk (46).

During the course of this study, 16 different implant types were used in the dental office or for other dentists. Sixty percent of the implants were Frialit II (28%), ZL implants (14%) and blades (17%). The lowest rates regarding survival were for ZL implants and blades. Both types were inserted in extremely small alveolar bone, whereby the vestibular or oral covering resp. of the implants with cortical bone was only a minimal thickness (of approx. 1 mm). This resulted more and more in peri-implant bone resorption with inflammatory situation or loosening.

Graf et al. (16, 17) ascertained in 2001 a survival rate of ZL implants with diameter 2.9 mm of 94.3% after 4.3 years. For blades, Fichtner et al. (14, 15) reported a failure rate of 20% after ten years. Due to the partly shorter use of the other implants, the results are limited to a few years only, but are around or above the 90% level. Only the Pitt-Easy screw implants show a success rate of 98% also after six years (Fig. 14). For all implants the failure rate was relatively high during the healing phase of up to six months. The post-prosthetidc failure is, however, low, for some implants like zero (Pitt-Easy Bio-Oss, Frialoc, Camlog, KSI-Bauer screw). The length of the implants has obviously an influence only after longer longevity periods, whereby lengths of below 11 mm

shows a higher survival rate above the sixth year (Fig.18). Regarding the implant diameter or thickness, no clear succession can be determined, only the small/slim ZI implants show a constantly decreasing curve (Fig. 19).

The complete evaluation showed that between the individual features of the study no sugnificant differences were ascertainable, i.e. the judgements can be regarded only as trend statements. The survival rate of implants is as high today that only with a very high amount of individual property groups the differences can be evaluated, and the data presented are still too small. Only three results indicate a positive success prognosis, females patients have a lower failure risk, fixed-cemented constructions on implants and/ or teeth and bars have post-prosthetically a positive success rate. In total, the results ascertained by the authors remain within the previous horizon of experience or slightly above and confirm that the implantology is a form of therapy which can be implemented successfully in the dental office.