Correlation between ISQ and Insertion Torque values using double acid-etched implants

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ABSTRACT

Aim The purpose of this study was threefold: (1) to consider whether there was a correlation between stability quotient values (ISQ) and insertion torque values (IT) at implant placement (2); to determine which of these values were more related to success or failure; and (3) to determine the influence of bone type and implant length, diameter and shape in the study results.

Materials and methods A retrospective clinical study was carried out between June 2012 and June 2014. The insertion torque and resonance frequency values of 279 double achid etched implants (Osseotite, Biomet 3i, Implant Innovations Inc., Palm Beach Gardens, USA), with conical and parallel walls, and of different diameters and lengths, were tested at the moment of insertion in 90 patients of different age (18-82 years of age/ average: 60.89 years) and of both genders (58 females and 32 males). Collected data were processed and subjected to statistical analysis.

Results The mean ISQ value was 70.54, showing no statistical significance between successful and unsuccessful implants. The mean IT value was 44.18. In this case, the values obtained showed a difference between successful and unsuccessful implants, yet not statistically significant ($p > 0.05$). However, statistically significant differences were found in relation to bone type, shape and length of the implants in IT as well as ISQ values. In the former case (IT values), the differences were only related to diameter.

Conclusion There was a correlation between ISQ and IT values; with no significant difference concerning success or failure. The variables analyzed showed statistical differences, except for diameter, which was only significant for IT.

KEYWORDS Dental implants; ISQ; Insertion torque; Resonance Frequency Analysis.

INTRODUCTION

Implantology continues to evolve and provide patients with functional solutions and immediate aesthetics to the lack of one or several teeth. In an effort to achieve this result, dentists face many biomechanical challenges. Indeed, to enable osseointegration, traditional protocols of dental implants require the implant to be osseointegrated before it can actually undergo occlusion and parafunctional forces (1, 2). On the other hand, the new protocols involve reduced healing periods, placement of short implants, implant insertion in lower quality bones and immediate implant-supported restorations (3, 4). These new protocols expose the implant to potential mechanical stress before biological integration occurs, which can put the implant at risk due to the micro-movements produced in the first stage of the osseointegration process.

It is well documented that the excess of micro-movements is detrimental to osseointegration, and that this is the most common cause of implant failure, especially if an immediate loading protocol is used (5,6). In order to avoid this complication, researchers have suggested that micro-movements should be controlled by splinting implants, or by securing a high primary stability of the implant (7, 8, 9, 10, 11). It is known that the primary stability plays an essential role in osseointegration success (12, 13, 14, 15, 16), and that it is influenced by the density of the bone, the surgical technique and the macroscopic morphology of the implant (1, 3, 4, 8, 9). It can be defined as the mechanical coherence between the bone and the dental implant immediately after its insertion; i.e. mechanical fixing (12, 17, 18). The secondary stability, by contrast, takes place after bone formation and remodelling and is directly related to the percentage of implant-bone contact obtained after osseointegration (i.e. biological fixing) (17, 18, 19). One of the most common techniques to evaluate the primary stability is to monitor the insertion torque when the implant is placed. A disadvantage of this method is that the insertion torque varies according to the cutting properties of the implant and the presence of fluids in the preparation. However, the method gathers information about the energy used in the implant insertion (18). Its main disadvantage is that insertion torque measurements can only be recorded when the implant is inserted, and not during the subsequent stages of the treatment. In addition, the primary stability can be measured through Resonance Frequency Analysis with specific equipment that provides objective and reliable measurements of the implant lateral micro-mobility, which is reflected in values called Implant Stability Quotient (ISQ). Resonance Frequency Analysis (RFA) is a bending test of the implant-bone system, which provides relevant clinical information about the condition of the implant-bone interface, in any stage of the treatment (18). In reference to the insertion torque values (IT), it was suggested that implants placed with an IT value of 35 N/cm or more, had higher survival rates than those placed in a range of 20 N/cm or less (20, 21). Besides, it was suggested that the range of stability lies in ISQ values of 50-80 (22, 23) with an average value of 70 (24). In relation to the ideal values for IT and ISQ, there is a general consensus that higher levels of initial bone-implant contact (IBIC), obtained by means of osteotomy, can be correlated with the highest ISQ and IT values (25, 26, 27, 28).

The goal of this clinical investigation was to analyze whether there was any correlation between implant stability quotient (ISQ) obtained through resonance frequency analysis (RFA) and implant insertion torque (IT) values of Osseotite implants (Biomet 3i, Implant Innovations Inc., Palm Beach Gardens, USA). This investigation was also intended to determine whether ISQ or IT were more related to implant success or failure. Finally, this investigation was aimed at identifying the influence of bone type, length, diameter and shape of the implants on ISQ and IT values.

MATERIALS AND METHODS

Experimental designs and cases selection

ISQ and IT of 279 double acid-etched surface implants (Biomet 3i, Implant Innovations Inc. Palm Beach Gardens, FL USA) were obtained. All of the implants used were external hexagon implant, with different diameters (3.25; 3.75; 4; 5; 6 mm) and lengths (7; 8.5; 10; 11.5; 13; 15; 18 mm); and shape, tapered or parallel walls (200 and 79, respectively). They were placed in 90 adult patients (age range: 18-82 years-old/ average: 60.89 years old) of both genders (32 males and 58 females) in a private practice by experienced surgeons (JCI, MCI) and over the residency program of Specialization in Oral Implantology at the School of Medicine of the Catholic University of Argentina.

Both IT and RFA measurements were performed during surgery, at the moment of implant insertion, and were registered in a database by the same performer. Only implants with both values (ISQ and IT) were included.

The implant insertion site was prepared by following the standard drilling protocol, using low-speed drills (1500 rpm) under saline solution irrigation. The insertion of the implants in the bone was performed at low speed (20 to 30 rpm) without irrigation.

In order to determine the size and method of the sample selection, a consecutive non-probability sampling was used, due to the fact that only those implants that met the inclusion criteria were considered. Both size and sample selection methods were established according to similar research studies (29, 30).

The study was carried out according to the Protection of Personal Data Acts (Acts 25 326 of the Argentine Republic, Act 9694 of the province of Córdoba, and the International Guidelines on Good Clinical Practice established by ANMAT (Administración Nacional de Medicamentos, Alimentos y Tecnología Médica, Argentina), and to the statement of ethical principles for medical research involving human subjects (Declaration of Helsinki, 2008).

Implant distribution

In relation to the shape of the implants, 200 implants were tapered while 79 were parallel wall design.

In relation to the diameter of the implants, there were 2 implants of 3.25 mm (0.75%), 15 of 3.75 mm (5.37%), 240 of 4 mm (86.02%), 20 of 5 mm (7.16%) and 2 of 6 mm (0.7%).

In relation to the length of the implants, there were 3 implants of 7 mm (1.08%), 14 of 8.5 mm (5.02%), 33 of 10 mm (11.82%), 46 of 11.5 mm (16.48%), 59 of 13 mm (21.14%), 114 implants of 15 mm (40.86 %) and 10 implants of 18 mm (3.58 %).

The distribution of the implants in relation to jawbones included 156 implants in upper maxilla and 123 implants in lower jaw, distributed in all the areas.

In relation to bone type, according to the bone classification system by Zarb and Lekholm (31-32), the distribution was as follows: Type I bone (n=6) 2.15%, Type II bone (n=93) 33.33%, Type III bone (n=168) 60.22%, Type IV bone (n=12) 4.3%.

Resonance Frequency Analysis and Insertion Torque Records

ISQ values were recorded with an Osstell ISQ® device (Integration Diagnostics, Goteborg, Sweden), which presented three components, including a wireless SmartPeg (SmartPeg Type 1) screwed to the implant, a measuring probe, and a display where data are shown and stored. The recording technique was simple, non-invasive, and contactless. It can be carried out in a few seconds, during which the patient didn't feel any pain, and it didn't affect the results at all (18, 33). The SmartPeg must be screwed to the implant, and the rod brought closer, and placed perpendicular to the SmartPeg long axis without touching it. When the SmartPeg is detected by the probe, this emitts a magnetic pulse to

GROUP ISQ	N	AVERAGE	SD	SE
Success	274	70.55	11.639	0.703
Failure	5	70.00	10.198	4.561
Total	279	70.54	11.598	0.694
GROUP IT	**N**	**AVERAGE**	**FROM**	**SE**
Success	274	44.32	18.030	1.089
Failure	5	36.00	13.874	6.205
Total	279	44.18	17.979	1.076

TABLE 1 Descriptive statistical values corresponding to the ISQ and IT variables.

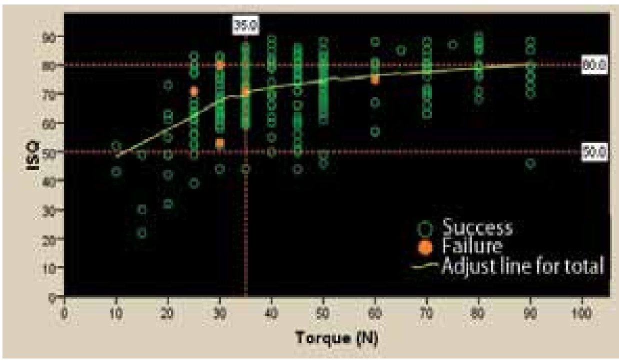

FIG. 1 ISQ vs IT scatter plot according to success and failures.

activate the SmartPeg. The information from the RFA is then displayed, as Implant Stability Quotient (ISQ), and ranges in a scale from 0 to 100.

IT measurement was obtained at implant placement using a Osseocision surgical drill unit (Biomet 3i, Implant Innovations Inc., Palm Beach Gardens, USA), which has a precise torque control that ranges from 5 to 50 N/cm. It started inserting the implant with the handpiece in a torque of 5 N/cm, and when the engine reached the pre-established torque, it emitted a sound and stopped; then the insertion torque must be lifted progressively until it reached to the complete implant settlement, thus obtaining the value of the final torque. If the insertion torque exceeded 50 N/cm, a high torque wrench was used, with values from 50 to 90 N/cm.

Success criteria

The following criteria were used to evaluate success: absence of infection, absence of pain, absence of clinical mobility, absence of peri-implant radiolucency; and absence of progressive and severe bone loss (34).

For this reason, all the implants were clinically and radiographically monitored for at least one year from the insertion date.

Once a year, bone level was measured by comparing parallel X-rays taken with a suitable device (Super Bite, Hawe Neos Dental, Bioggio, Switzerland) at the moment of surgery.

Statistical analysis

All the values were registered in a table and analyzed through descriptive statistics and with specific statistical evidence. The following variables were evaluated according to the objectives proposed.

1. Level of correlation between IT and ISQ.
2. Correlation between IT and ISQ values and implant success/failure.
3. Influence of implant dimensions (width and length) over ISQ and IT values.
4. Influence of bone type over ISQ and IT values.
5. Influence of implant shape over ISQ and IT values.

RESULTS

Correlation between IT and ISQ

The descriptive statistical values corresponding to ISQ and IT variables are shown in tTable 1.

The ISQ average value barely differed in successful and failed cases (70.55 and 70.00, respectively), but when observing the IT values, they presented differences (44.32 vs. 36.00, respectively), though not statistically significant ($p>0.05$ according to Mann-Whitney test).

Figure 1 shows the distribution of information according to the relation ISQ-IT, and the adjustment or trend line (green, continuous line) that responds to a non linear function with a steep slope in the inferior torque range (up to 35 N/cm) and from this value on, a more horizontal line is drawn. This means that the correlation between the ISQ and IT values was more pronounced in the inferior range, where ISQ values were correlated very significantly with torque values, and with a high degree of dispersion. As regards the superior range (> 35 N/cm), the correlation was less pronounced and had less dispersion At this last stretch, the torque increases did not influence the ISQ values in the same way as in the inferior range.

35 N/cm was taken as cut-off point since this was the minimum value that seemed to guarantee a primary stability enabling an osseointegration process free of micro-movements in immediate loading procedures; consequently, it had a high practical value (11, 24) (Table 2).

Influence of implant diameter over ISQ

The influence of implant diameter over the ISQ values is presented in table 3.

Since the data distribution in some diameter categories did not respond to a normal distribution, the groups were compared to each other through the Kruskal-Wallis non-parametric test, and it was determined that the ISQ differences between the width categories did not result statistically significant ($p>0.05$). Therefore, it is suggested that the null hypothesis could be accepted:

RANGE UP TO 35 NCM	N	AVERAGE	SD	PEARSON'S CORRELATION	BILATERAL SIGNIFICANT (P-VALUE)
ISQ	129	66.10	11.87	0.524**	<<0.001
Torque (N)	129	29.65	5.77		
RANGE MORE THAN 35 NCM	**N**	**AVERAGE**	**SD**		
ISQ	150	74.35	9.91	0.222""	
Torque (N)	150	56.67	15.32		
** The correlation is significant at level 0.01 (bilateral) The correlation is significant in both ranges taken into consideration (p<0.05).					

TABLE 2 Torque Range: up to 35 Ncm and more than 35 Ncm.

"The implant diameter is not a significant factor associated with the ISQ values".

Influence of implant diameter over IT

The influence of diameter over IT values is presented in table 4.
The correlation was determined between both variables (Pearson's correlation: 0.545*) (bilateral significance p=0.036).

Influence of implant length over ISQ

The influence of implant length over ISQ values is presented in table 5.
Since data distribution in some of the length categories did not respond to a normal distribution, the groups were compared to each other through the Kruskal-Wallis non-parametric test and it was determined that the ISQ differences between the implant length categories resulted statistically significant (p<0.05). Therefore, it is suggested that the alternative hypothesis could be accepted: "Implant length is a factor significantly associated with the ISQ values".
When performing a multiple comparison through the Mann-Whitney test, it was verified that the implant group with lengths superior to 15 mm recorded ISQ values significantly lower than the shorter implants (p<0.05).

Influence of implant length over IT

The influence of implant length over IT values is presented in table 6.
Since data distribution in some of the length categories did not respond to a normal distribution, the groups were compared to each other through the Kruskal-Wallis non-parametric test and it was determined that the torque differences between the implant length categories resulted statistically significant (p<0.05).
When performing a multiple comparison through the Mann-Whitney test, it was verified that the implant group with lengths superior to 15 mm was the one that distanced itself significantly from the majority of the medium-range group, with torque values inferior to the rest.

ISQ variation according to bone type

The influence of bone type according to Zarb-Lekholm over the ISQ values is presented in table 7.
The assumptions of normal data distribution were corroborated in all the bone type categories through the Kolmogorov-Smirnov test, and the homogeneity of the variances through the Levene test, for which the groups were compared by one-way and factorial Analysis of Variance (ANOVA). It was determined that the ISQ differences between types of bone resulted statistically significant (p<0.05). Therefore, an

IMPLANT WIDTH	N	AVERAGE	MEDIAN	SD	SE
Up to 3.75 (mm)	17	64.35	67.00	11.82	2.866
4 mm	240	71.12	73.00	11.29	0.729
5 mm or more	22	69.00	71.00	13.63	2.905

TABLE 3 ISQ values according to implant width.

WIDTH	N	AVERAGE	MEDIAN	SD	SE
Up to 3.75 (mm)	17	35.88	35.00	11.49	2.786
4 mm	240	44.65	40.00	18.33	1.183
5 mm or more	22	45.45	40.00	17.18	3.662

TABLE 4 Torque values (N) according to implant width.

LENGTH	N	AVERAGE	MEDIAN	SD	SE
< to 10 mm	17	72.00	71.00	10.02	2.430
from 10 to 15 mm	252	70.86	73.00	11.57	0.729
> 15 mm	10	59.90	58.00	10.40	3.288

TABLE 5 ISQ values according to implant length.

LENGTH	N	AVERAGE	MEDIAN	SD	SE
< to 10 mm	17	39.71	35.00	15.26	3.700
from 10 to 15 mm	252	44.96	40.00	18.24	1.149
> 15 mm	10	32.00	32.50	8.56	2.708

TABLE 6 Torque values (N) according to implant length.

alternative hypothesis could be accepted: "The type of bone is a factor significantly associated with the ISQ values".
The homogeneous subsets (1, 2 and 3) of bone type categories shared characteristics and were not statistically different amongst each other (p>0.05), but they were not significantly in line from the rest of the groups (p<0.05).

IT variation according to bone type

The influence of the type of bone over IT values is presented in table 8.
The groups were compared by ANOVA. It was determined that the IT differences between types of bones were statistically significant (p<0.05). Therefore, it was suggested that the alternative hypothesis could be accepted: "The type of bone is a factor significantly associated with IT values".
The homogeneous subsets (1, 2 and 3) of bone type categories shared similar characteristics and were not statistically different amongst each other (p>0.05), but distanced themselves significantly from the rest of the groups (p<0.05). Type I bone differed from the rest, which recorded the higher torque values (73.33N), types II and III did not differ significantly amongst each other, type IV did not differ from type III, but it differed from types II and I.

Influence of implant shape over ISQ

The influence of implant shape over ISQ values is presented in table 9.
Since the data distribution in some diameter categories did not respond to a normal distribution, the groups were compared to each other by using the Mann-Whitney non-parametric test and it was determined that the ISQ differences between the shape categories were statistically significant (p<0.05). Therefore, it was suggested that the alternative hypothesis could be accepted: "Implant shape is a factor significantly associated with their stability (ISQ)".

Influence of implant shape over IT

The influence of the implant shape over IT values is presented in table 10. In order to determine if the

BONE TYPE	N	AVERAGE	MEDIAN	SD	SE
Type I	6	81.17	81.00	6.68	2.725
Type II	93	74.70	77.00	8.78	0.911
Type III	168	69.14	71.00	11.64	0.898
Type IV	12	52.50	54.00	9.29	2.681
Alpha subset = .05		1 1	2	3	
Type IV	12	52.50			
Type III	168		69.14		
Type II	93		74.70	74.70	
Type I	6			81.17	
Sig. (p-value)		1.000	.478	.341	

TABLE 7 ISQ values according to Bone Type and Tukey's HSD test.

BONE TYPE	N	AVERAGE	MEDIAN	SD	SE
Type I	6	73.33	75.00	16.33	6.667
Type II	93	50.91	50.00	19.45	2.017
Type III	168	40.51	35.00	14.71	1.135
Type IV	12	28.75	25.00	16.94	4.890
Alpha subset = .05		1 1	2	3	
Type IV	12	28.75			
Type III	168	40.51	40.51		
Type II	93		50.91		
Type I	6			73.33	
Sig. (p-value)		.212	.315	1.000	

TABLE 8 Torque (N) values according to Bone type and Tukey's HSD test.

SHAPE	N	AVERAGE	MEDIAN	SD	SE	MANN-WHITNEY TEST (P-VALUE)
Tapered	200	72,95	75,00	10,45	0,74	$p < 0.001$
Parallel Walls	79	64,44	64,00	12,19	1,37	

TABLE 9 ISQ values according to implant shape.

SHAPE	N	AVERAGE	MEDIAN	SD	SE	MANN-WHITNEY TEST (P-VALUE)
Tapered	200	47,38	45,00	18,92	1,34	$p < 0.001$
Parallel Walls	79	36,08	35,00	12,11	1,36	

TABLE 10 Torque values (N) according to implant shape.

registered torque values in both evaluated shapes differed significantly, they were compared to each other by using the Mann-Whitney non-parametric test, which resulted in statistically significant differences ($p<0.05$); therefore, it was suggested that the alternative hypothesis could be: "Implant shape is a factor significantly associated with the recorded torque power".

DISCUSSION

Primary stability plays an essential role in achieving a successful osseointegration and it is influenced by the density of the bone, the surgical technique and the macroscopic morphology of the implant. RFA and IT measurements are two effective methods to quantify the initial implant stability.
This study, demonstrates the correlation of these two methods to measure implant primary stability. There were slight differences between the results obtained via each method, but they were not statistically significant ($p>0.05$).
These results were comparable to those of Al-Nawas (27), who experimented in a dog model, in which similar values were also found. Ilser Turkyilmaz (30), in a study on human beings, found a significant correlation between these values. Similar results were obtained by Boronat-López et al. (29), who observed and established a close correlation between ISQ and IT values.
Even so, IT values had more relation with success or failure, since four out of five cases of failed attempts recorded torque values equal or inferior to 35 N/cm (80 % of failed attempts). However, it should be noted that the sample size (5 failures) and the high standard error (6.205) increased the possibilities of producing a type II error, and of accepting the null hypothesis as valid; even when the correct hypothesis could actually be the alternative one.
The correlation between ISQ and IT was more pronounced in the range up to 35 N/cm, where the ISQ values correlated very significantly with the torque values. While in range >35 N/cm, the correlation was less pronounced.
The clinical perception of primary stability is directly related to the rotational resistance during the insertion of the implant (IT). Trisi P et al. (35) related primary stability to high torque values, considering the latter to be over 35 N/cm and which, in turn, would allow the performance of protocols of immediate load. It was found that the rise in the IT led to improvements in primary stability.
It could be said that if enough primary stability is achieved, immediate loading procedures could be performed with minimal chances of compromising osseointegration, provided that the rest of the essential factors inside the surgery protocols are respected (implant length and diameter, implant appropriate surface, bone quantity and quality, biological aspects, systemic diseases, etc.).
In a study about immediate load of Osseotite implants, Ibañez et al. (11) showed a high predictability when control of micro-movements during the healing process were taken into account. They obtained a high rate of success with an ISQ equal or over 50.
Trisi et al. (35), in an *in vitro* study, where they were trying to correlate ISQ values with implant micro-movement levels, found that there was an inverse correlation between ISQ and micro-movement, which might lead us to assume that one implant was more stable than another. However, they found different micro-movement rates associated with equal ISQ values, therefore they concluded that RFA cannot be taken as an absolute parameter to measure the implant stability, since it only measures the stiffness of the structure connected to the instrument.
With regard to bone type, most of the studies established a correlation between the different types of bones, the RFA and IT values. The studies carried out by O'Sullivan et.al. (28) compared the IT with the properties of bones in corpses and they obtained high values in bone type I - II – III, and lower values in bone type IV. These results were followed by Boronat-Lopez (29) et al., who reported higher ISQ values in implants inserted in bones of denser structure. Also Turkyilmaz (30-33) et al. in 2008 published works with statistically significant relations between the bone density and the ISQ and IT values.
Hong-Gi Yoon (36), in a study on pig rib bones, *in vitro*, analyzed the ISQ behavior in bone types I and II and concluded that there is considerable influence in the values found according to the type of bone.

Similar results were found in this study about Osseotite implants, where not only ISQ values but also IT values, related to the type of bone according to Trisi and Rao (32) and according to Zarb and Lekholm (31), presented statistically significant differences among the four types of bones. Type I (or dense) bone showed the highest ISQ and IT values, distancing themselves from values of type II-III (or normal) bone, and the lowest values were found in type IV (or soft) bone.
Another aspect analyzed in this research was the relationship that exists between implant diameter, IT and ISQ values. The values obtained from ISQ showed no significant differences between the different groups of implants (3.75; 4 and 5 mm) ($p>0.05$). Consequently, it can be said that the implant diameter wasn't a factor significantly associated with the ISQ values. However, this was not the case for IT values, which presented differences between groups; but these differences were statistically significant, for those implants which had not an ISQ variation with a larger implant diameter, but had a rise in the IT. This could be explained by making reference to the fact that as the implant width rises, it gets closer to the cortical in the most occlusal part of the bone and, therefore, the resistance to the implant insertion increases, but the implant body stays in relation to the spongy part of the bone, for which the ISQ does not increase in the same way. In 2006, Boronat-López (29) made similar discoveries in relation to IT values. In 2008, the same author(37) carried out a study on RFA and ruled out the clinical assumptions that when the implant width increases, the ISQ rises, since there were no statistically significant differences obtained between the variables.
When the behavior of the IT and ISQ values were analyzed in relation to implant length, it was determined that the ISQ differences between the implant length categories were statistically significant ($p<0.05$); therefore it is suggested to accept the hypothesis that implant length is a factor significantly associated with the ISQ values. But unlike when performing a multiple comparison through the Mann-Whitney test, it was verified that the implant group with lengths superior to 15 mm registered ISQ values significantly lower than shorter implants ($p<0.05$).
Concerning the torque, the groups were compared to each other through the Kruskal-Wallis non-parametric test and it was determined that the torque differences between the implant length categories were statistically significant ($p<0.05$).
When performing a multiple comparison through the Mann-Whitney test, it was verified that the implant group with lengths superior to 15 mm was the one that distanced itself significantly from the majority or medium-range group, with torque values inferior to the rest. From the physical perspective, a positive correlation would be expected between the implant length and IT, since the longer the length, the larger the surface and greater the strength, and higher the torque. This approach has been corroborated only in the first two measures, but the reduction in torque values in the larger implants opposed this assumption. A factor that could explain this situation was the type of bone, which in this category, was III or IV in the ten cases. All of them were in the upper jawbones and the majority on its posterior part (pterigoid implants).
Finally, in relation to implant shape (parallel walls or tapered), the results obtained in this study were similar to those obtained by Garcia Vives (12), who concluded that implants with conical design revealed higher IT and RFA values than the ones with parallel walls. Similar results were obtained by Al-Nawas et al. (27), who also stated that the macrostructure of the implant was important for the primary stability and that conical implants presented insertion torque values higher than the cylindrical ones.

CONCLUSION

According to the results obtained in this study, it was found that there was a correlation between ISQ and IT values; with no statistically significant difference in relation to success and failure. The different variables analyzed (implant length, bone type and implant shape) influenced both values significantly, except for the diameter, which was only significant for the insertion torque.

Conflict of Interest

The authors declare no conflict of interest with trademarks.

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