

ISQ: What is it and how to use it in implant dentistry to improve clinical outcomes

Peter K. Moy¹

The use of dental implants to replace missing teeth has become a routine treatment modality. With the acceptance of this form of treatment, patient demands have increased for sooner completion of their treatment and long-term predictability. The clinician must be able to meet the demands from their patients for quicker loading protocols and higher predictability.

The Osstell® Resonance Frequency Analyzer (RFA) unit is a device that measures a sound wave (resonance frequency) generated by the unit and sent through the implant body by way of a rod (Smart peg) [Figure 1] connected to the implant.¹ Depending on the magnitude and amplitude of the sound wave, the Osstell® assigns a number (Implant Stability Quotient or ISQ) [Figure 2] indicating how stable the implant is.

The advancements and improvements made to the Osstell® unit have made it possible for the clinician to determine the primary stability established at the time of implant placement by using the Osstell®.² Once the stability of an implant (ISQ) is measured this baseline reading

along with obtaining additional and successive ISQ measurements will enable the clinician to determine how the process of Osseointegration is progressing.³ This method of assessing implant stability can provide the clinician with information that can be used to assure their patient that the implant is ready to take prosthetic loading and more importantly, the implant will provide long-term support for a definitive prosthesis. [Figures 3 - 8] There are



Figure 1: Smart-peg attached to implant and the Osstell unit.

¹ Peter K. Moy, DMD
 Professor, Department of Oral & Maxillofacial
 Surgery, Nobel Biocare Endowed Chair, Surgical
 Implant Dentistry, UCLA, School of Dentistry

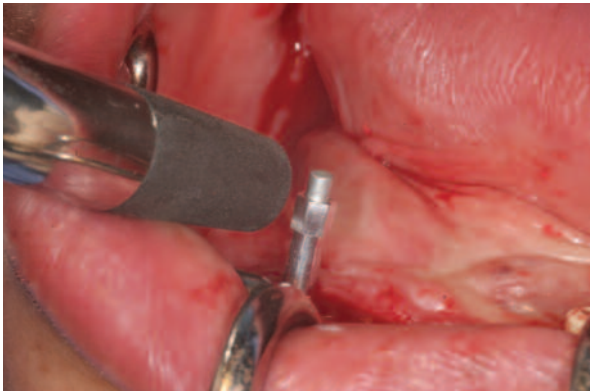


Figure 2: ISQ reading of this implant with a value of 84 indicating a very stable implant.

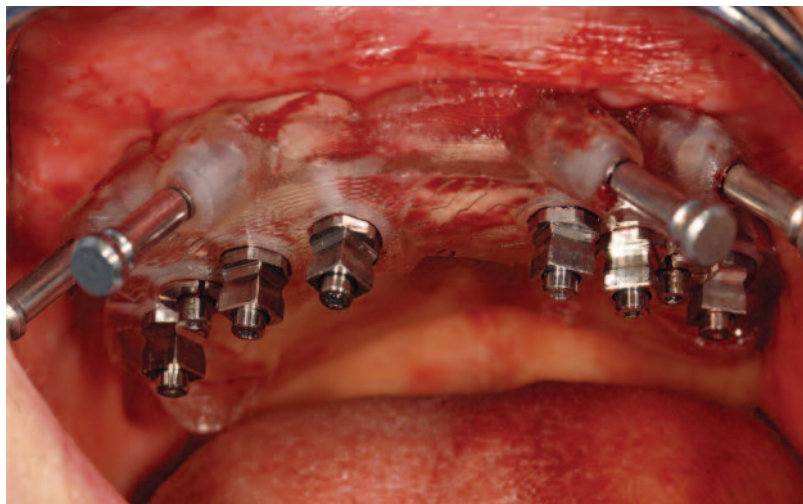


Figure 3: Implants placed using "guided surgical template" and flapless surgery (Nobel Biocare, Inc.).

		STAGE I															
		Implant System: <u>NBC</u>														Date: <u>12-20-09</u>	
A- R-	No ISQ															No ISQ SXR SWP	A- R-
RIGHT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	LEFT
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	

Figure 4: Initial ISQ measurements on implants just placed indicating "initial stability". The posterior implants had sufficiently high ISQ values to permit immediate loading protocol. The lower ISQ values with anterior implants will be assisted by the splinting effect and cross-arch stabilization with a full fixed prosthesis.

several advantages to comparing successive ISQ measurements to a baseline recording. These advantages include permitting the clinician to predictably develop proper loading protocol for an implant that was placed,^{4v}

determine when an implant may take permanent loading or accept a definitive prosthesis⁵, when an implant may be losing integration or in the process of failing.

The use of Ostell and obtaining ISQ measurements in

MISCELLANEOUS

Reason: ISQ Reading 6 1/2 months Reason: _____
 Date: 7/9/07 Date: _____
 Implant #: _____ Implant #: _____

mentor 1

	A11															
	60			68	60	53		60		55		53	59	60		
RIGHT	①	2	3	④	⑤	⑥	7	⑧	9	⑩	11	⑫	⑬	⑭	15	16
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
																LEFT

Figure 7: Third ISQ measurements indicating all implants have reached a steady state (note all readings were the same or higher than previous) and the definitive prosthesis should be delivered.

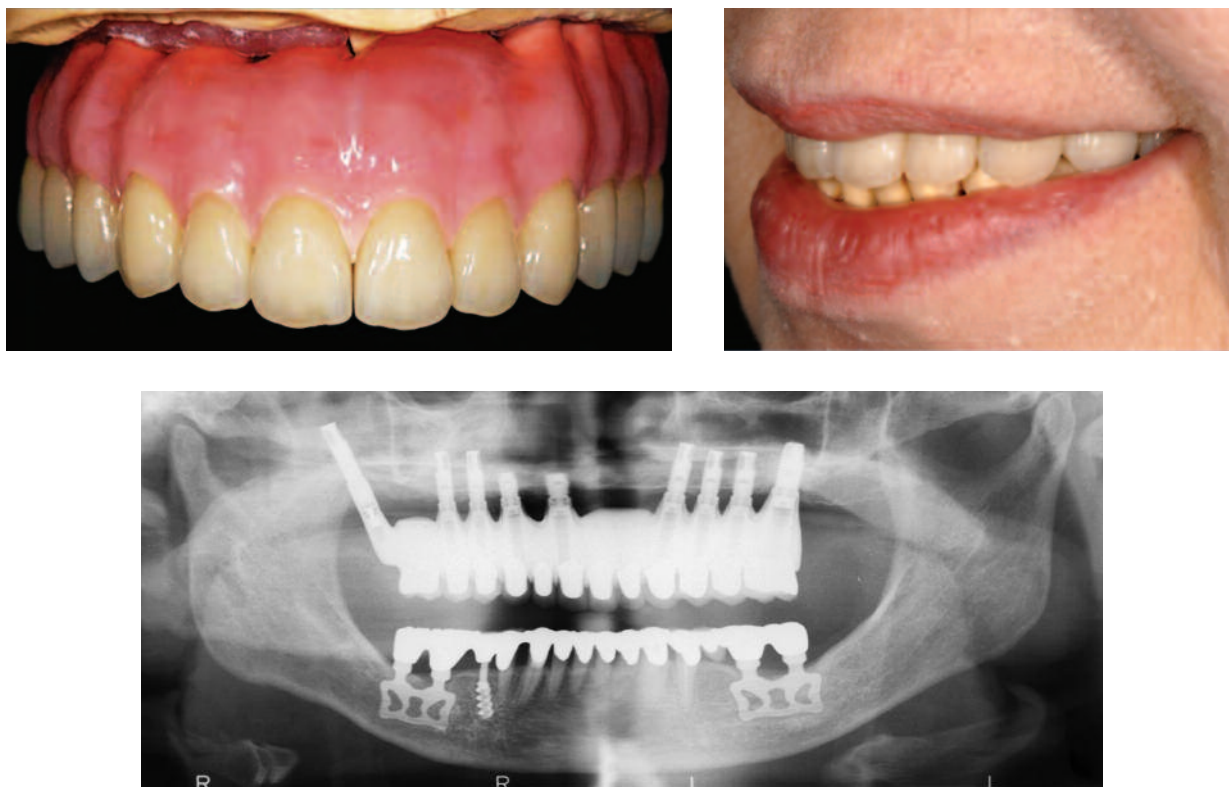


Figure 8: Definitive fixed prosthesis, radiographic confirmation that prosthesis is completely seated and clinical view.

References

1. Meredith N, Alleyne D, Cawley P. Quantitative determination of the stability of the implant-tissue interface using resonance frequency analysis. Clin Oral Implants Res. 1996;7:261-7.
2. Degidi M, Piattelli A, Carinci F Parallel screw cylinder implants: comparative analysis between immediate loading and two-stage healing of 1,005 dental implants with a 2-year follow up. Clin Implant Dent Relat Res. 2006;8:151-60.
3. Sennerby L, Meredith N. Resonance frequency analysis:

measuring implant stability and osseointegration. Compend Contin Educ Dent. 1998;19:493-8, 500, 502; quiz 504.

4. Ersanli S, Karabuda C, Beck F, Leblebicioglu B. Resonance frequency analysis of one-stage dental implant stability during the osseointegration period. J Periodontol. 2005;76:1066-71.
5. Ostman PO, Hellman M, Sennerby L. Direct implant loading in the edentulous maxilla using a bone density-adapted surgical protocol and primary implant stability criteria for inclusion. Clin Implant Dent Relat Res. 2005;7 Suppl 1:S60-9.