

Old and New Concepts in Long Term Implant Success: A Review

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Abstract: *Introduction: This article intends to review the past and newer concepts in implantology, to gauge the long-term success of an implant.*

Materials: The standards like presence of infection, discomfort, paraesthesia or anaesthesia, bone loss, gingival health, pocket depth, durability, effect on adjacent teeth, function, aesthetics, intrusion on the mandibular canal, patient's emotional and psychological attitude and satisfaction are considered in evaluation. Earlier concepts, given by Schnitman and Schulman(1979), Cranin et al(1982), McKinney et al. (1984) were evaluated along with newer concepts like the influence of width of attached gingiva, type of suture material used, associated medical conditions, smoking, width of the implant, genetic and immunological markers, exposure to radiation therapy and the type of flap used.

Results: Relating positive and negative factors of implant success gives the implant quotient. While earlier, the evaluation of implant success revolved round the stability, immobile, peri- implant radiolucency, loss of marginal bone and absence of infection or discomfort to the patient, the recent studies show that attached gingiva width, co- existing medical conditions, smoking, width of the implant, suture material used, all play a crucial role in implant success. The genetic and immunological factors like TNF- α and IL- 1β are identified as diagnostic markers for implant success.

1. Conclusion:

The basic criteria for implant success is the absence of peri-implant radiolucency. The width of the attached gingiva must be adequate, and there should be absence of infection, without implant mobility. Co-existing medical conditions, and smoking also play a role in evaluating the success of an implant. When compared to a narrow implant, wider implants show long-term success.

2. Introduction:

This article intends to review the past and new concepts to gauge the long-term success of an implant. The standards like presence of infection, discomfort, paraesthesia or anaesthesia, bone loss, gingival health, pocket depth, durability, effect on adjacent teeth, function, aesthetics,

intrusion on the mandibular canal, patient's emotional and psychological attitude and satisfaction are considered in evaluation. [2]

Earlier Concepts:

Schnitman and schulman, [3] 1979:

- Mobility but 1 mm in any direction: Radiological observed radiolucency graded but no success criterion defined.
- Loss of surrounding alveolar bone not greater than one third of the vertical height of the bone
- Gingival inflammation amenable to treatment, absence of symptoms and infection, absence of injury to adjacent teeth, absence of paraesthesia and anaesthesia, or violation of the mandibular canal, sinus or floor of the nasal passage.
- Functional service for five years in 75% of patients

Cranin et al.[4] 1982:

The implants were in place 60 months or more-

- Lack of great evidence of cervical saucerisation on radiographs.
- Freed from haemorrhage according to Muhleman's index. Absence of mobility.
- Without pain or percussive tenderness
- No gingival hyperplasia and no evidence of a widening peri-implant space on radiograph

McKinney et al.[5] 1984:

Subjective criteria: Adequate function, absence of discomfort, patient belief, aesthetics and emotional and psychological attitudes are improved.

Objective criteria: Good occlusal balance and vertical dimension, functionally stable without symptoms after 5 years, gingival inflammation vulnerable to treatment. Mobility of but 1 mm buccolingually, mesiodistally, and vertically. Absence of symptoms and infection associated with the implant, absence of injury to adjacent tooth or teeth and their supporting structures. Absence of paraesthesia or anaesthesia or any violation of mandibular canal, sinus, or floor of nasal passage.

Healthy collagenous tissue without polymorphonuclear infiltration.

Success criterions: Provides functional service for five years in 75% of implant patients.

Possible criteria for fulfilment

Mobility: A two-point scale like mobile or immobile implant are often used. An extra test is to tap the implant with an instrument. No mobility, but if the sound is dull, the implant isn't osseointegrated and is surrounded by fibrous tissue.

Peri-implant radiolucency: An implant with radiolucency around it should not be judged as successful.

Marginal bone loss: Adell et al. [6] determined that the Branemark Osseo integrated implants has 1.5 mm of mean bone loss for the first year of dental implant placement and followed by 0.1 mm of mean bone loss per successive years. Mean bone loss of 0.2 mm per was accepted as a criterion for fulfilment . [2]

Albrektsson et al. [7] 1986 stated that the individual unattached implant that's isn't mobile when tested clinically. Radiographically, that does not demonstrate any evidence of radiolucency. Bone loss that's 0.2 mm annually after the implant's first year of service, no persistent pain, discomfort or infection

By these criteria, successful rate of 85% at the highest of a 5-year observation period and 80% at the highest of a ten year period are minimum levels for fulfilment.

Present Concepts

The earlier concepts are formed in the thought for evaluation of dental implant success, recently many other factors are also found to play a crucial role in long-term success of a dental implant:

- Width of the attached gingiva: The implant failed if the width of the attached gingiva is \leq 2 mm. Some Other studies have shown that the thin or absent of masticatory gingival with bleeding on probing has a significantly greater mean loss of alveolar bone. [8]
- Sutures: Silk sutures were less likely to support bacterial colonization than other suture materials which minimizes the prospect of odontogenic infections. [9] Use of polyglactin 910 was associated with a far better incidence of early loss of implants.
- Associated Medical Conditions: Some Studies found co-existing medical problems are the reason for early loss of implant, but not significantly so. Some other studies states that type 2 diabetes has a possible adverse effect on survival of implants,[10] but there's no conclusive evidence.[1]
- Smoking: There's evidence to suggest that smoking may have a dose related effect on Osseo integration.[12]
- Width of the Implant: A recent study described that short and narrow implants are the reason for early loss of implant.[13] One possible explanation is that short and narrow implants are usually placed in areas in which there's limited space or insufficient volume of bone.[1]
- Genetic and immunological markers: A study evaluated immunological diagnostic markers to predict titanium implant failure. TNF- α and IL- 1 β release on titanium stimulation were significantly higher among patients with implant loss.[1]
- Implant success in radiated mandibles and fibula flap: 89.2% success of implants in fibula grafts and 87.18% success in irradiated mandibles with the utilization of hyperbaric oxygen therapy. [15,16]

3. Discussion

Earlier, the evaluation of implant success revolved round the stability, immobile, peri- implant radiolucency, loss of marginal bone and absence of infection or discomfort to the patient. By relating positive and negative factors of implant success the implant quotient is derived.[17]. Currently, implant success is evaluated by tons of things along with the sooner ones.

In recent studies the attached gingiva width, co- existing medical conditions, smoking, width of the implant, suture material used, all play a crucial role in implant success. The genetic and immunological factors like TNF- α and IL- 1 β are identified as diagnostic markers for implant success.

4. Conclusion

The basic criteria for implant success absence of peri- implant radiolucency, width of the attached gingiva must be adequate, absence of infection, without mobility. Compared to narrow implant, wider implant has long- term success. Co- existing medical conditions, and smoking also play a major important role in evaluating the success of an implant.

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