

IMPLANTS: SUCCESSFUL, SURVIVING OR FAILED

Member presentation

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WHEN YOU THINK OF AN IMPLANT SUCCESS RATE, WHAT PERCENTAGE DO YOU THINK?

Typical studies show survival rates of implants between 90-100% over varying lengths of time.



DO YOU THINK THIS IS REALISTIC SUCCESS OVER
10-20 YEARS?

Probably not.

Most studies define success as survival. That is: if the implant is still in the mouth it is a success.

This does not consider bone loss, peri-implantitis or other complications

Longer time period will likely = more complications and ultimately more failures.

PJETURSSON BE, SWAHLEN M, LANG NP. QUALITY OF REPORTING OF CLINICAL STUDIES TO ASSESS AND COMPARE PERFORMANCE OF IMPLANT SUPPORTED RESTORATIONS. JOURNAL CLINICAL PERIODONTOLOGY 2012;39 (SUPPL 12):139-159.¹

- **Single Crown on single implant**



- Analysis based on 13 studies
- 465 implants placed and restored with single crowns
- In meta analysis annual failure rate = 1.14% = 94.5 % success rate for 5 years
- Additionally they found 5 year complication rate of 9.7 %
 - (Soft tissue complications or peri-implantitis)

IMPLANTS SUPPORTING FIXED DENTAL PROSTHESIS



- Analysis based on 17 studies
- 1384 implant supported fixed dental prosthesis were evaluated
- Annual failure rate of 0.99 % = success rate of about 95% over 5 years
- Additionally they found 5 year complication rate of 8.6%
 - (Soft tissue complications or peri-implantitis)

THE FINE PRINT

- The studies they included had to be at least 5 years in length
- *“Survival was defined as the restoration remaining in situ at the follow-up examination”*
- Higher Failure rate at 10 years.



When evaluating studies to include in their analysis the authors found many complications including:

- Poorly described design
- Poorly defined eligibility criteria
- Lack of information of cofounding factors i.e. smoking and diabetes
- Number of patients lost due to no follow up
- Only info on survival not on complication rate
- Did not discuss possibility of study bias

DA SILVA J, KAZIMIROFF J, PAPAS A, ET AL; OUTCOMES OF IMPLANTS AND RESTORATIONS PLACED IN GENERAL DENTAL PRACTICES. JADA 2014; 145(7): 704-713.²

- A retrospective study by the PEARL network (Practitioners Engaged in Applied Research and Learning)
- **PEARL**—*Practitioners Engaged in Applied Research and Learning*—is an NIH-sponsored network of private-practice dentists who conduct clinical studies in the course of routine patient care. PEARL Network studies originate with ideas submitted by PEARL members and seek answers to questions of immediate interest to their profession.

RETROSPECTIVE STUDY METHODS²

- 919 patients enrolled in the study, each patient had 1 implant evaluated
- Patients enrolled from 87 different offices in 25 different states
- 309 implants from Nobel, 166 Straumann, 121 Branemark, 92 Zimmer, and 73 from Biomet. (Multiple other implant types make up the remaining 249)

RETROSPECTIVE STUDY METHODS²

- 2 different classifications in this study
 - Classification 1 = **survival** = was implant present or not
 - Classification 2 = **success** = Implant is present with restoration and in function, no pain on percussion, no mobility, no overt per-implant pathology or no excessive crestal bone loss.
 - (excessive crestal bone loss defined as the presence of bone loss in excess of 0.2mm per year after initial loss of 2mm.)

RESULTS

- Mean follow up time of 4.2 years only 20 implants were missing = **97.8%** survival rate
- If you considered implants with pain to percussion, excessive bone loss, not in function, peri-implantitis or mobility to be failures than 172 implants failed for a **81.3 %** success rate.

THIS STUDY WOULD CONSIDER THIS IMPLANT A SURVIVAL.



WHO WOULD CONSIDER THIS IMPLANT A
FAILURE?

THIS GUY!





ARE THERE PROBLEMS WITH THESE STUDIES?

- OF COURSE

- Different doctors placing the implants with different procedures
 - Different sites
 - Different implants
 - Only 1 implant per person evaluated – eliminates cluster failures
 - Only documents patients who return – patients with failed implants may have left long ago
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SO WHAT'S THE POINT?

- 1-2 million implants placed annually in USA
 - 2-4 million are estimated to be placed annually by 2020
 - As more implants are placed and more time goes on we will be dealing with more implants with more problems
 - SO – we need to know how to treat failing and failed implants
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CRITERION FOR EVALUATING IMPLANTS

- In 1993 a quality of health scale for implants was developed by James and modified by Carl Misch. In 2007 a consensus conference was sponsored by International conference of Oral Implantologists – They modified the James-Mische scale and created these categories.
- **Group 1 = Success** – No pain, mobility or exudate and less than 2 mm of radiographic bone loss
- **Group II = Satisfactory survival** – No pain, mobility or exudate and 2-4 mm of radiographic bone loss

CRITERION FOR EVALUATING IMPLANTS

- Group III – **Compromised survival** – No mobility, radiographic bone loss of more than 4 mm, but less than $\frac{1}{2}$ of implant length, probing depth of more than 4 mm
- Group IV = **Failure** – Pain on functioning, mobility, radiographic bone loss of more than $\frac{1}{2}$ implant length and uncontrolled exudate.

HOW TO TREAT FAILING IMPLANTS

- Non surgical, i.e. non surgical scaling and root planning
 - This could include use of local antibiotics
 - Also could include Use of photodynamic therapy – placing a dye/drug around implant and activating it with a laser
 - Diode laser with special attachment and a photosensitizer (dye)
 - Current studies are limited small numbers of studies with small numbers of patients.
 - The studies indicate the treatment is more successful than no treatment but not as successful as surgical therapy
 - It is still debatable if PDT is better than traditional non surgical debridement
 - Upside – less risk of recession in esthetic areas.



NON- SURGICAL THERAPY

- Evidence does suggest that non surgical therapy with a chlorhexidine rinse can be effective in reducing implant inflammation.
- Conflicting data present on whether adding minocycline, doxycycline, or laser therapy greatly increases the success of non-surgical therapy.
- Adding antibiotics or laser decontamination does not decrease treatment success but may not greatly improve it.



HOW TO TREAT FAILING IMPLANTS CONT.

- Surgical tx – Flap and debridement
- Extraction and reimplantation
- Extraction and restoring without implants



DEFINITIVE SIGNS ON WHEN TO REMOVE AN IMPLANT³

- Mobility
- Pain on functioning
 - Make sure it is the implant that is causing the pain and not a loose abutment/crown
- Continuous radiolucency around the entire implant



DEFINITIVE SIGNS ON WHEN TO REMOVE AN IMPLANT³

- More than 50% bone loss prior to restoring the implant
- More than 75% bone loss after restoring an implant or less than 3 mm in bone
 - *The bone loss recommendations are just guidelines, obviously there may be conditions in which leaving an implant with extensive bone loss is an option.



WHEN TO USE NON SURGICAL THERAPY

- Peri – implant mucostitis⁴
 - Defined as a disease in which the presence of inflammation is confined to the soft tissues surrounding a dental implant and no additional bone lost after initial bone remodeling.
 - Signs and symptoms – Less than 2 mm bone loss, and increasing probe depths, bleeding on probing or suppuration
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WHEN TO USE NON SURGICAL THERAPY

- When moderate bone loss is present and patient refuses surgical therapy
- If patient is too old or too unhealthy to subject him/her to surgery
- If the patient indicates that they will not replace the implant due to financial or personal reasons and additional bone loss will not endanger other teeth or prosthetics
- If an implant lost bone support for no apparent reason but the bone loss has stopped and additional bone loss will not endanger other teeth or prosthetics.³

WHEN TO USE SURGICAL THERAPY?

- Essentially for Group II and III implants. That is - implants that have “Satisfactory survival” or “Compromised Survival”
- Patients who are willing to try to save implant



WHEN TO USE SURGICAL THERAPY?

- Non surgical therapy will unlikely be successful
- Non surgical therapy has failed
- Bone loss is present but not enough to justify removing the implant



FACTORS TO CONSIDER WHEN DECIDING BETWEEN REMOVAL AND SURGICAL THERAPY

- Evaluate possible negative outcomes if surgical therapy fails
 - Waste of time and money
 - Additional surgery for patient
 - Further bone loss
 - May harm other near by teeth or implants
 - May reduce success rate or ability to place a 2nd implant
 - Evaluate possible positive outcomes if surgical therapy is successful
 - Save time and money
 - Less surgery
 - Maintain the implant
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SAMPLE SURGICAL THERAPY⁴

- The goal of surgical therapy is to debride the defect and decontaminate the implant. The theory is that the removal of the primary etiology (biofilm) from the implant will allow for healing and stabilization.
 - 1. Reflect full thickness flap
 - 2. Ultrasonic instrumentation with implant tip to remove granulomatous tissue
 - 3. Manual instrumentation with titanium curette
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SAMPLE SURGICAL THERAPY⁴

- 4. Air polish with sodium bicarbonate powder and glycine (EMS)
- 5. Tetracycline for 3 min
- 6. Placement of graft materials- CT graft, membranes, bone or combination of materials.
- 7. Flap closure

WHAT DOES THE RESEARCH SAY ABOUT SURGICAL THERAPY?⁵

- No great studies available providing the gold standard for surgical therapy
 - Minimal studies available which are long term and include large numbers of implants
 - Many protocols are used on multiple types conditions with multiple types of implants making accurate retrospective systemic reviews inaccurate
- (2003) Leonhardt et al. 26 implants with more than 3 threads exposed treated with flap, debridement and hydrogen peroxide = 58% success at 5 years. 7 implants lost, 4 lost more bone, 6 gained bone, and 9 stabilized.

Renvert S et al. (2012) Reviewed 26 peri-implantitis studies and concluded:

- Surgical therapy can be effective
- While failures do occur, placing bone graft around implants during surgical therapy does reduce bleeding on probing and increase radiographic bone fill
- Rough implant surfaces will likely be less responsive to treatment (TPS - titanium plasma spray) vs (SLA – Sand blasted, large grit, acid etched)



Renvert S et al. (2012) Reviewed 26 peri-implantitis studies and concluded – Cont

- Guided tissue regeneration using barrier membrane alone often results in more complications
- Guided tissue regeneration with barrier membranes and grafting materials do not appear to have benefit over grafting materials alone
- Laser decontamination, abrasive devices or implantoplasty show promise but more research is needed.
- Surgical therapy with or without bone has been successful for patients in the short term but no long term studies

REIMPLANTATION



- Data from 6 human studies show reimplantation when a previous implant has failed 1 time.
- Survival rates range from 71-100% with follow up of 9 months to 4 years
- Average Survival rate = 87% over 2-3 years
 - Note this is survival rate – reimplantation has a higher rate of failure

REIMPLANTATION

- 2nd reimplantation (3rd attempt) from 4 studies
 - Survival rates from 50-100 %
 - In 3 of the studies 3rd attempt implants had a lower survival rate.
 - All studies were monitored for short periods (10 months)

REFERENCES

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