



 Metro Toronto Convention Centre
May 8 - 10, 2008

The Toronto Osseointegration Conference Revisited

What have we learned from clinical trials about early loading of implants?

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Faculty of Dentistry, University of Toronto

 SEARCH: (early OR immediate) load* implant* (dentistry OR dental)
→ N= 709 since 1988



NCBI PubMed
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www.ncbi.nlm.nih.gov

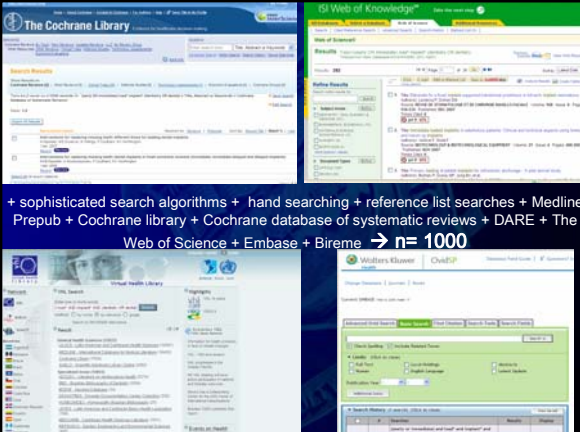
Search: (early OR immediate) load* implant* (dentistry OR dental)
→ N= 709 since 1988

Wildcard search for 'implant*' used only the first 600 variations. Lengthen the root word to search for all endings.
See Details

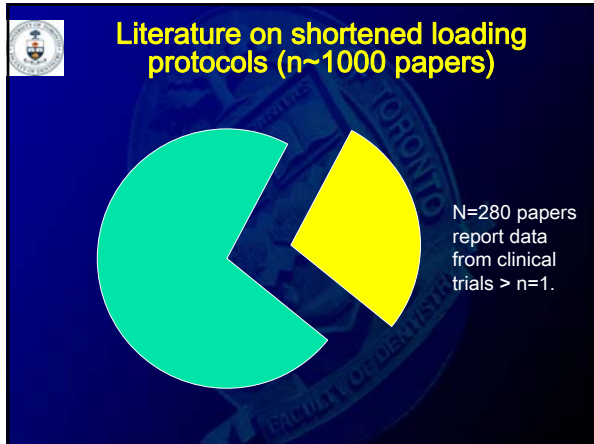
Display: Summary Show 20 Sort By Send to

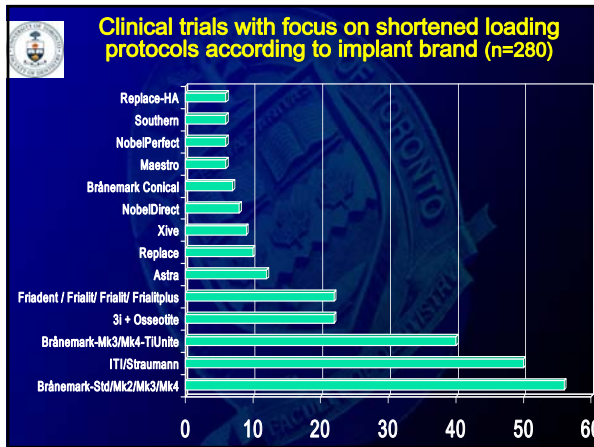
Items 1 - 20 of 709 Page 1

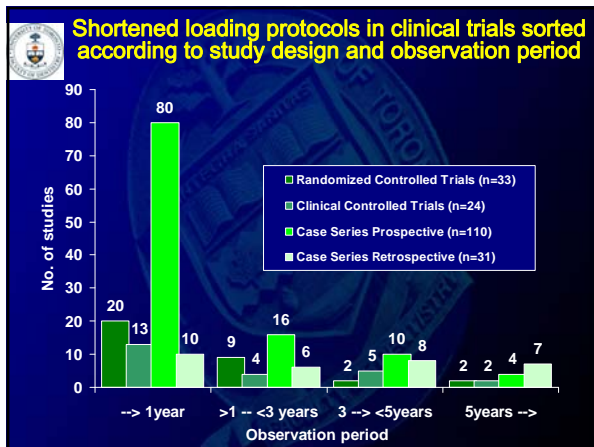
- 1. Tabbal T, Beresford M, Fowl M, Moss M, Evans D, Craig C, Fox J. Immediate function with fixed implant supported maxillary dentures: A 12-month pilot study. J Prosthet Dent. 2007 Jun;97(6):594-600. Review as: J Prosthet Dent. 2008 Mar;99(3):167. PMID: 17449046 [PubMed - in process]
- 2. Grewer P, Zentgraf A, Radtke R, Wankark S. Five-year results of implants with an oxidized surface placed predominantly in soft quality bone and subjected to immediate occlusal loading. J Prosthet Dent. 2007 Jun;97(6):594-600. Review as: J Prosthet Dent. 2008 Mar;99(3):167. PMID: 17449046 [PubMed - indexed for MEDLINE]
- 3. Bole S, Chalkley T, Hamedani L, Akbar Z. The use of finite element analysis to model bone-implant contact with basal implants. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2000 Apr;25 [Epub ahead of print]. PMID: 11430551 [PubMed - as expected by publisher]
- 4. Yliniemi R, Sogard R. Immediate and early function of implants placed in extraction sockets of maxillary edentulous teeth: a pilot study. J Prosthet Dent. 2007 Jun;97(6):594-600. Review as: J Prosthet Dent. 2008 Mar;99(3):167. PMID: 17449046 [PubMed - indexed for MEDLINE]



+ sophisticated search algorithms + hand searching + reference list searches + Medline Prepub + Cochrane library + Cochrane database of systematic reviews + DARE + The Web of Science + Embase + Bireme → n= 1000









General information

The first trials

- 1968 – 1975 (Brånemark et al. 1977: Experience from a 10-year period)
- TPS implants (Ledermann 1978); Tübinger Al_2O_3 (Schulte 1978)

The largest RCT trials

- 52 patients and 104 implants (Testori et al. 2007)
- 24 patients and 142 implants (Fischer et al. 2008)

The longest follow up RCT trial

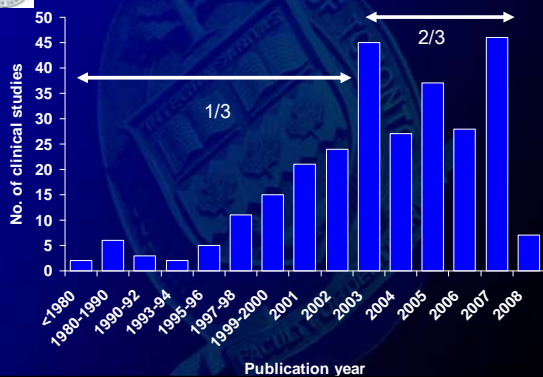
- 5 years (Rocuzzo et al., 2008 & Fischer et al. 2008)

The longest observation period

- 8-18 years, average 12, retrospective studies on ITI implants placed in the edentulous mandible (Lambrecht & Hodel 2007)



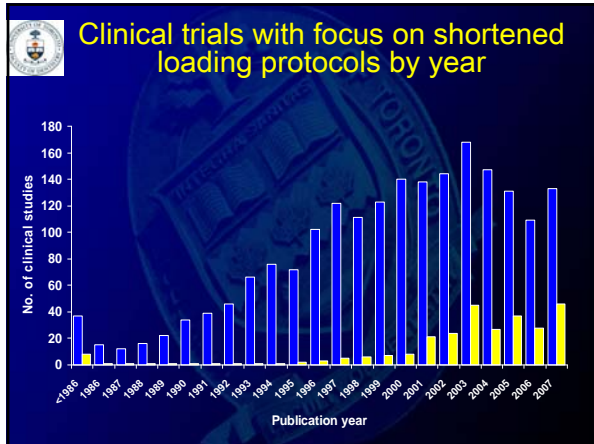
Clinical trials with focus on shortened loading protocols by year (n= 280)

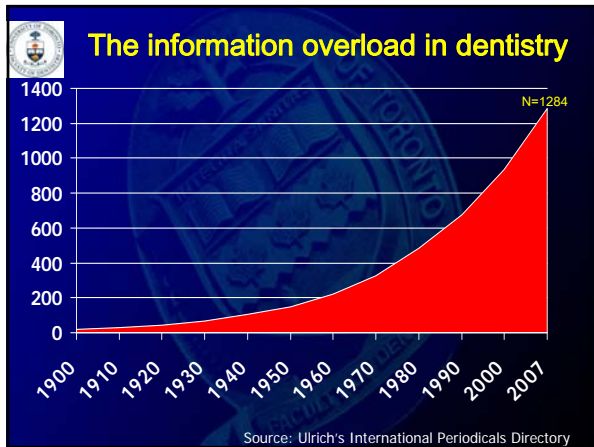


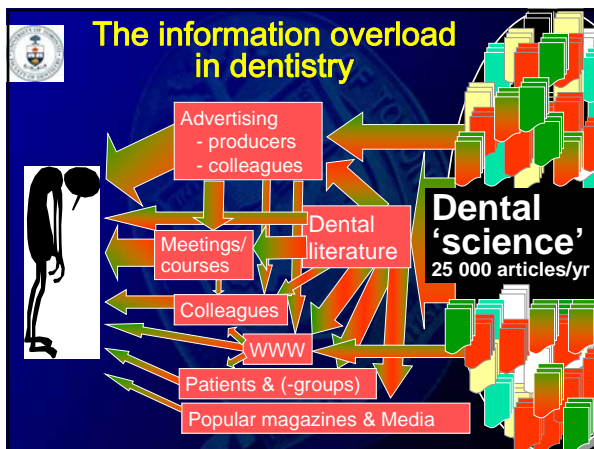


Clinical trials with focus on dental implants by year (n ~2000 trials)









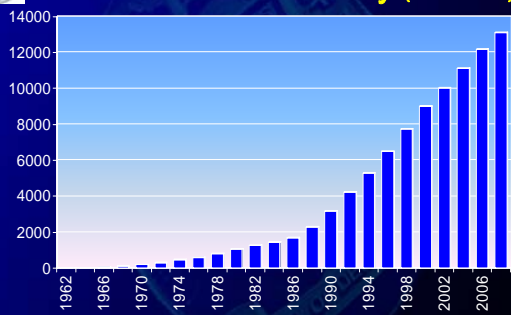


Solution?

Limit the reading to only Reviews?



Reviews in Dentistry (n=13,187)



(Source: Medline. OVID search strategy: review.pt + exp dentistry)



Literature on shortened loading protocols (n~1000 papers)

Animal studies
Case Reports
Clinical trials
Other





Reviews - problems

Usually:

- written by a single topic expert
- based on their understanding of the literature
- no methodology is given
- a broad based subject is addressed
- the conclusions and advises differ



Solution?

Drop the narrative style and look for the Systematic Reviews (SRs)?

Search PubMed for "systematic review" OR meta-analysis

Display: Summary | Sort: | Save: | Text: | Clip Add: | Order: |

Page 2314 of 2315

11566 Lindeman JG, Carpenter WF Jr, Stroup JS. Brochures and schizophrenia patients: A comparative study. *Am J Psychiatry*. 1975 Dec;132(12):1257-64. PMID: 1200169 [PubMed - indexed for MEDLINE]

11567 Miller FH, Schaefer HJ, Rotzke JL, McLean D. A new consideration in antibiotic therapy. The classical tetracycline. *Clin Orthop*. 1975 Sep;111:158-69. PMID: 125638 [PubMed - indexed for MEDLINE]

11568 **Chabot E.** A systematic review of the genus *Pterocarya* (Araucarioxymonophytes). *Acadologia*. 1973 Nov;15(2):240-88. No abstract available. PMID: 4804191 [PubMed - indexed for MEDLINE]

11569 Levy J. Autokinetic illusion: a systematic review of theories, measures, and independent variables. *Psychol Bull*. 1972 Dec;78(6):457-74. Review. No abstract available. PMID: 456651 [PubMed - indexed for MEDLINE]

11570 Bricker SW, Cozart HC, Baret O. [Screening for macrocarcinosis (cystic fibrosis-CF). Systematic review and results]. *Monatsschr Kinderheilkd*. 1971 Dec;119(12):632-7. German. No abstract available. PMID: 4455018 [PubMed - indexed for MEDLINE]

"Systematic reviews" appear in 1971, 1972 & 1973!?



***"Systematic"
review?***

Is just a word!



Systematic Review:

**5 Qualifiers are
required**



SR: 5 qualifiers

1. Question or hypothesis
2. All publications on the topic
3. Valid criteria to include or exclude identified studies
4. Extracted relevant data combined and compared
5. Conclusions based solely on the extracted data and the presence or absence of supporting evidence



Systematic Reviews - problems

- The selection of studies to include in SRs will reflect conclusions
- The study methodology aspects will reflect conclusions
- Need to focus on studies with good methodological designs



5 qualifiers required:

How effective is Guided Tissue Regeneration (GTR) when there is localized bone loss around teeth?





SR Conclusions: GTR attachment gain compared to open flap debridement

Laurell et al. *J Periodontol* 1998: 2.7 mm

- Uncontrolled and unblinded studies

Cortellini et al. *Periodontology* 2000 2000: 1.6 mm

- Unclear selection criteria for studies
- Inclusion of studies of short duration

Needleman et al. *Cochrane Review* 2001: 1.1 mm

- Randomised, controlled trials
- Trials only comparing GTR vs flap debridement
- Trials > 12 months
- Furcation involvements excluded

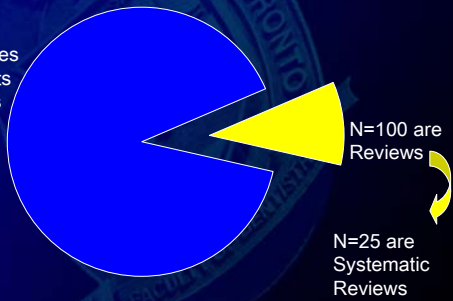


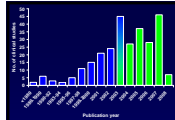
In other words:
Garbage in →
Garbage out.



Literature on shortened loading protocols (n~1000 papers)

Animal studies
Case Reports
Clinical trials
Other





Best Systematic Reviews on shortened loading protocols

- Esposito et al. 2007(2004). *Cochrane Syst Rev.*
- Jokstad & Carr. 2007. *Int J Oral Maxillofac Impl*
- Nkenke & Fenner. 2006. *Clin Oral Implants Res*
- Del Fabbro et al. 2006. *Int J Periodont Restor Dent*
- Attard & Zarb. 2005. *J Prosthet Dent*
- Cochran et al. 2004. *Int J Oral Maxillofac Impl*

| Study | Fajardo et al. (2007) | Jokstad & Carr (2007) | Dell'abbro et al. (2006) | Nienke & Fenner (2006) | Attard & Zarb (2005) | Cochrane et al. 111 Workshop (2004) |
|-----------------------------|-----------------------|-----------------------|--------------------------|------------------------|----------------------|-------------------------------------|
| Dhanrajani & Al-Rafee 2005 | --- | Retros | --- | --- | --- | --- |
| Vanden Bogaerde et al. 2005 | --- | CCT | --- | --- | --- | --- |
| Osman et al. 2005 | --- | excluded | --- | X | --- | --- |
| Nadir et al. 2004 | --- | CCT | --- | --- | --- | --- |
| Bischof et al. 2004 | --- | --- | --- | --- | --- | --- |
| Salvi et al. 2004 | excluded | RCT | --- | --- | --- | X |
| Fischer & Stenberg 2004 | X | RCT | --- | --- | X | X |
| Testori et al. 2004 | --- | excluded | X | X | X | --- |
| Camizzaco & Leone 2003 | X | CCT | X | X | X | X |
| Imbesi et al. 2003 | --- | CCT | --- | --- | --- | --- |
| Malo et al. 2003 | --- | Retros | X | --- | X | --- |
| Testori et al. 2003b | excluded | CCT | X | --- | X | --- |
| Wolffinger et al. 2003 | --- | Submerg | X | --- | X | X |
| Babhi & Wolffinger 1997 | --- | --- | --- | --- | --- | --- |
| Dagidi & Platelli 2003 | --- | excluded | X | X | X | --- |
| Rzeci et al. 2003 | --- | --- | X | X | X | --- |
| Tawse-Smith et al. 2002 | X | RCT | --- | --- | X | X |
| Payne et al. 2002 | X | RCT | --- | --- | X | X |
| Romeo et al. 2002 | X | RCT | X | X | X | X |
| Gatti & Chiapasco 2002 | --- | excluded | X | X | X | --- |
| Chausu et al. 2001 | --- | excluded | X | X | X | --- |
| Chiapasco et al. 2001 | X | RCT | X | X | X | X |
| De Bruyn et al. 2001 | --- | Submerg | --- | --- | X | --- |
| Royssidat et al. 2001 | --- | CCT | --- | --- | X | --- |
| Ericsson et al. 2000 | --- | excluded | --- | --- | X | X |
| Rocenzio et al. 2001 | excluded | excluded | --- | --- | X | X |
| Jo et al. 2001 | --- | excluded | --- | --- | --- | X |
| Random et al. 2001 | --- | excluded | --- | --- | --- | X |
| Schinman et al. 1997 | --- | Submerg | X | --- | X | X |
| Schinman et al. 1990 | --- | --- | --- | --- | --- | --- |
| Tarnow et al. 1997 | --- | Submerg | X | --- | X | --- |

Reasons Systematic Reviews appraise different papers

- Inadequate literature search
- Selection bias
- Variable inclusion and exclusion criteria
 - CHECK: Excluded papers and reasons
- PICO question
 - Relative merit ?
 - Predictability ?

| | Relative merit | Predictability |
|----|---|---|
| 1. | High quality RCT with narrow confidence Interval | Cohort study with ≥ 80% follow-up |
| 2. | Cohort study or low quality RCT - e.g. <80% follow-up | Retrospective cohort study or follow-up of untreated control patients in an RCT |
| 3. | Case-Control Study | |
| 4. | Case-series (and poor quality cohort and case-control studies) | Case-series (and poor quality cohort studies) |
| 5. | Expert opinion without explicit critical appraisal, or based on physiology, or bench research | Expert opinion without explicit critical appraisal, or based on physiology, or bench research |

Appropriate Study Designs to address implementation of interventions

| | Qualitative research | Survey | Case Control | Cohort | RCT | Non-experimental | Systematic review |
|---|----------------------|--------|--------------|--------|-----|------------------|-------------------|
| Effectiveness: Does it work? | | | | ☆ | ☆☆ | ☆ | ☆☆☆☆ |
| Process of intervention/delivery: How does it work? | ☆☆ | ☆ | | | | ☆ | ☆☆☆☆ |
| Salience: Does it matter? | ☆☆ | ☆☆ | | | | | ☆☆☆☆ |
| Safety: Will it do more good than harm? | ☆ | | ☆ | ☆ | ☆☆ | ☆ | ☆☆☆☆ |
| Acceptability: Will the patient accept the intervention? | ☆☆ | ☆ | | | ☆ | ☆ | ☆☆☆☆ |
| Cost effectiveness: Is it worth paying for the intervention? | | | | | ☆☆ | | ☆☆☆☆ |
| Appropriateness: Is this the right intervention for this patient? | ☆☆ | ☆☆ | | | | | ☆☆ |
| Satisfaction with the intervention: Are users, providers and other stakeholders satisfied? | ☆☆ | ☆☆ | ☆ | ☆ | | | ☆ |

JOMI
The International Journal of ORAL & MAXILLOFACIAL IMPLANTS
The Official Journal of the Academy of Oromaxillofacial Dentistry

State Science ON IMPLANT DENTISTRY
CONSENSUS CONFERENCE PROCEEDINGS

1882 → 187 → 22 papers

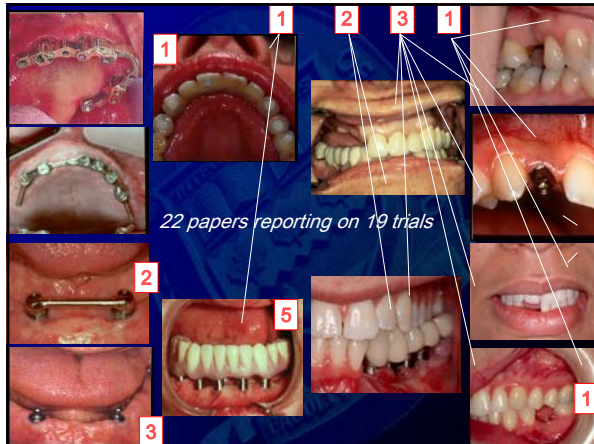
SECTION 1
What is the Effect on Outcomes of Time-to-Loading of a Fixed or Removable Prosthesis Placed on Implant(s)?
Adrian Johnson, PhD, Alan S. Coe, DMD

Purpose: A systematic review of the available literature to assess the effects of time to loading of complete or treatment outcomes. Methods: Database search strategies identifying relevant trials on implant or maxillae, combined with searching of a personal library, and reference lists from included studies, resulted in 4,062 items published before May 15, 2009. Ten independent reviewers appraised the titles and abstracts and identified 287 papers that seemed to focus on the effects of time to loading on treatment outcomes in clinical trials. These papers were re-evaluated and critically appraised to fulfill a set of prespecified inclusion and exclusion criteria. Papers were included in the review if both an experimental and a control group were adequately described, if the patients had been followed for at least 1 year, and if the sample included at least 5 patients. Results: Seventeen papers, published between 1991 and 2009, described the influence of time to loading on implant treatment outcomes. Seven trials were randomized controlled trials, 11 were retrospective with concurrent controls, and 1 was retrospective with concurrent non-randomized controls. The general impression of the papers was that (1) the methodology of the trials was often poor; (2) the treatment outcomes were mostly subjective and/or unvalidated; and (3) the follow-up times were relatively short. Statistical comparisons between subjects were considered inappropriate because of the heterogeneity of trials. Data from 23 trials reporting different patient follow-up periods between 1 and 27 years suggest that the overall performance was not significantly different between immediately or early loaded implants versus implants using a conventional loading period. Conclusions: While the limitations of the study procedures in the papers reported in this systematic review, although the average outcome was in favor of delayed loading, there are no indications that immediate or early loading caused a negative outcome. Key words: early loading, immediate loading, and implants, overdentures, prosthodontics

Clinical variables with potential influence on treatment outcomes

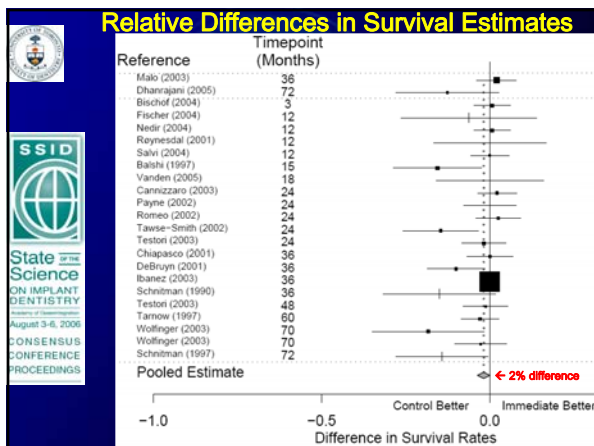
- Patient inclusion and exclusion criteria (e.g. host factors, smoking, parafunction, bone type, etc.)
- State of dentition and intra-oral implant site

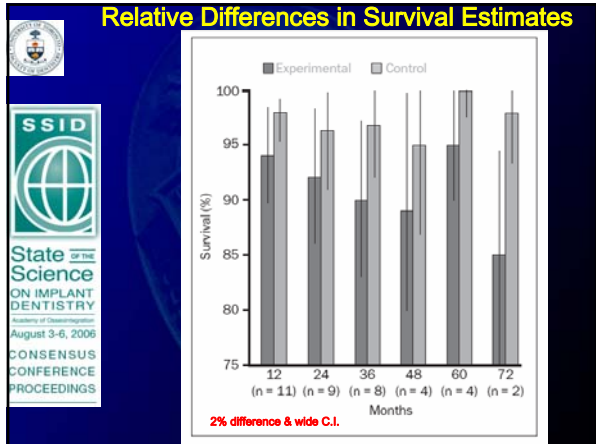
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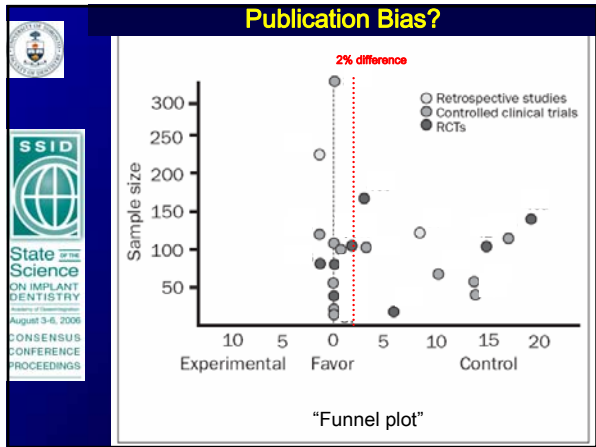


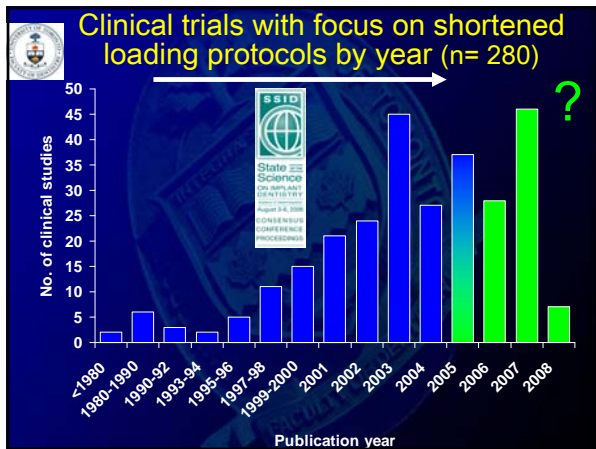
Clinical variables with potential influence on treatment outcomes

- Patient inclusion and exclusion criteria (e.g. host factors, smoking, parafunction, bone type, etc.)
- State of dentition and intra-oral implant site
- Number of implants to support a superstructure
- Nature of implant-supported superstructure
- Clinical procedures (e.g. stage of healing following extraction, site preparation, torque, etc.)
- Implant morphology (smooth, microrough, rough)
- Treatment outcome criteria
- Observation period

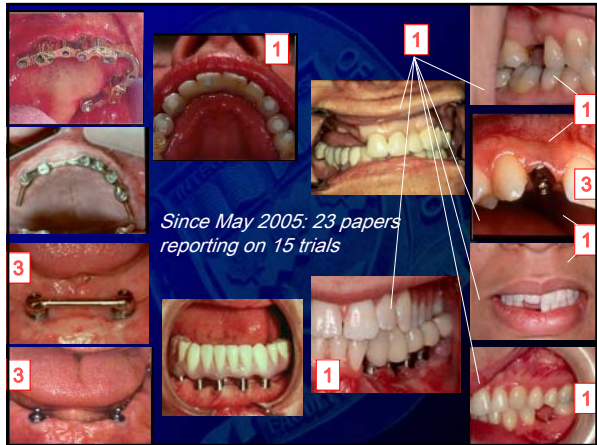








| Authors | 23 reports | Study | product | n-pas | n-imp | Time y. |
|------------------------|------------|-------|---|-------|-------|---------|
| Fischer et al. | 2 reports | RCT | ITI-sla | 24 | 142 | 5 |
| Guncu et al. | 2 reports | RCT | Branemark-Mk3-TIU | 13 | 26 | 1-0.2 |
| Testori et al. | 1 report | RCT | Osseotite-FNT | 52 | 104 | 1 |
| De Smet et al. | 1 report | CCT | Brånemark / Brånemark-Novum | 30 | 70 | 2-1 |
| Stephan et al. | 1 report | CCT | Brånemark-Mk3-TIU | 26 | 78 | 2 |
| Assad et al. | 1 report | RCT | Paragon | 10 | 40 | 2 |
| Romanos and Nentwig | 1 report | RCT | Ankylos | 12 | 36 | 2 |
| Turkyilmaz et al. | 4 reports | RCT | Branemark-Mk3-TIU | 20 | 40 | 2 |
| Turkyilmaz et al. | 1 report | CCT | Branemark-Mk3-TIU | 29 | 59 | 4 |
| Oh et al. | 1 report | RCT | Zimmer | 24 | 25 | 0.5 |
| Hall et al. | 2 reports | RCT | Southern | 28 | 28 | 1 |
| Turkyilmaz et al. | 3 reports | CCT | Brånemark-Mk3-TIU | 26 | 52 | 1 |
| Brochu et al. | 1 report | CCT | Brånemark-TIU | 22 | 41 | 0.3 |
| Otoni et al. | 1 report | Other | Frailit-2 | 23 | 46 | 2 |
| Tsirilis AT | 1 report | CCT | Frailit-2(14) Osseotite(15) Osseotite-NT(14) | 38 | 43 | 2 |



Summary

- In comparative trials, shortened loading protocols compared to delayed loading has in average 2% lower survival rates and more unpredictable outcomes
- Limited data suggest that shortened loading protocols in the interforaminal area can be considered as a reasonable treatment alternative to delayed loading
- It has not been demonstrated that a shortened loading protocol in itself is harmful.
- Considerations when treatment planning must be based on individual patient needs and expectations



*Thank you for your
kind attention*
