

“Green” situation / management



Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with no anatomical constraints, characterized by a favourable status and no/few demands re. treatment preference

ANATOMICAL CONSTRAINTS	
Bone Height	≥ 11mm
Bone Width	> 8mm
Bone Quality (Lekholm/Zarb)-during drilling	I-II
Bone augmentation / Fresh Extraction Sockets	No
Maxillo-mandibular relation	Adequate
PATIENT STATUS	
History of periodontal disease	No
History of Bruxism	No
Smoking	No/minor
Smile Line	Low
PATIENT PREFERENCE	
Expenses (# of implants / type of prosthesis)	e.g. 2 /removable
Loading	Delayed

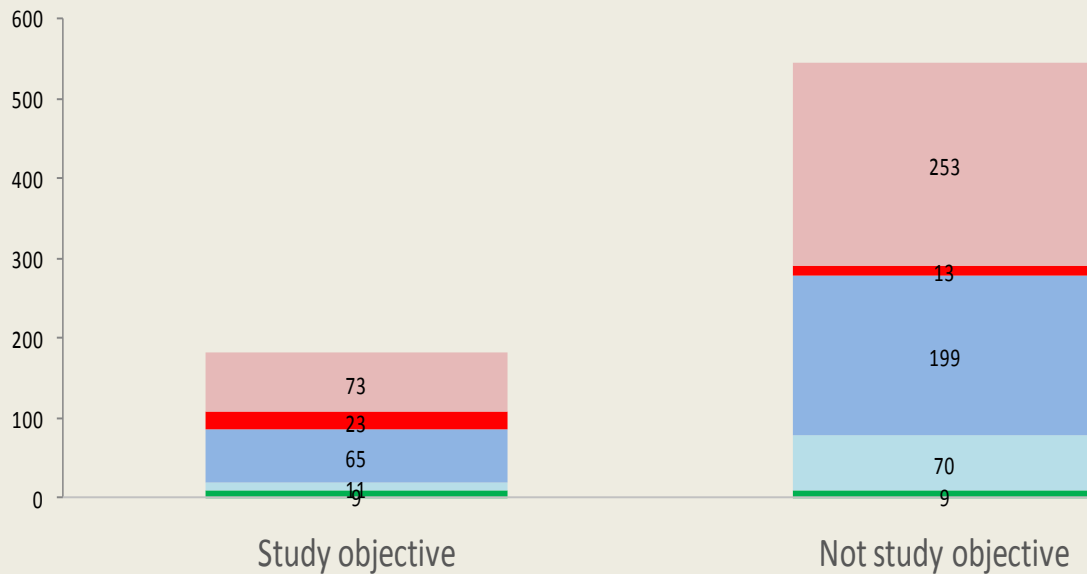
GUIDELINE re. IMPLANT DESIGN ASPECTS:

Clinicians may treat patients by using a range of different implant designs/ surfaces/ implant-abutment connections and materials.

Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with no anatomical constraints, characterized by a favourable status and no/few demands re. treatment preference

GREEN

■ Included
■ Not included, <10
■ Not included < 2y.
■ Excluded, subsequent d.
■ Excl. - no maxilla data



Literature, implant design aspects Relevant SRs since 2010 (28):

Implant length

Srinivasan ea, 2013, Elangovan ea, 2013, Monje ea, 2013, Neldam ea, 2012, Srinivasan ea, 2012, Atieh ea, 2012, Pommer ea, 2011, Sun ea, 2011, Annibali ea, 2011, Menchero-Cantalejo ea, 2011, Bateli ea, 2011, Aloy-Prósper ea, 2011, Telleman ea, 2011, Romeo ea, 2010

Implant Material

van Oirschot ea, 2012, Alsabeeha ea, 2012

Implant Platform

Schmitt ea, 2013, Bishti ea, 2013, Gracis ea, 2012, Annibali ea, 2012, Al-Nsour ea, 2012, Abduo ea, 2011, Atieh ea, 2010

Implant Diameter

Sohrabi ea, 2012

Implant Diameter and length

Monje ea, 2013

Implant Surface

Renvert ea, 2011

One-piece implants

Barrachina-Diez ea, 2013

Bone level – tissue level implants

Vouros ea, 2012

studies: 9

RCT: 2

CCT: 2

Prospective CS: 1

Retrospective CS: 4

studies: 9

RCT: 0

CCT: 0

Prospective CS: 2

Retrospective CS: 7

Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with no anatomical constraints, characterized by a favourable status and no/few demands re. treatment preference

Evidence for management, from studies protocol-designed to assess effects of implant design (/ -feature)

	YES	NO
Design		Ravald ea 2013 Olsson ea 1995 Nelson ea 2008
Diameter	Degidi ea 2005	
Length	Kinsel ea 2007	vanAssche ea 2011 Schwartz-Arad ea 2004
Surface	Schwartz-Arad ea 2004 Malo ea 2007	
Material	Morris ea 2001	

studies: 9

RCT: 2

CCT: 2

Prospective CS: 1

Retrospective CS: 4

Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with no anatomical constraints, characterized by a favourable status and no/few demands re. treatment preference

Evidence from studies with no pre-hoc stated objective to assess a particular implant design feature, albeit reported as effect on outcome

	YES	NO	POSSIBLE
Type	Degidi & Piatelli 2003	Ibanez ea 2005	
Diameter	Watson ea 1998		
Length	Jemt & Johansson 2006 Jemt & Lekholm 1995 Watson ea 1998 Kiener ea 2001	Palmqvist ea 1994 Ibanez ea 2005	Friberg & Jemt 2008 # studies: 9 RCT: 0 CCT: 0 Prospective CS: 2 Retrospective CS: 7
Surface		Jemt ea 2011	
Material			



“Yellow” situation / management



Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with anatomical constraints, characterized by a non-optimal status but no/few demands re. treatment preference

ANATOMICAL CONSTRAINTS	
Bone Height	8-10mm
Bone Width	4-8mm
Bone Quality (Lekholm/Zarb)-during drilling	III-IV
Bone augmentation / Fresh Extraction Sockets	Yes (healed)
Maxillo-mandibular Relation	Vertically or horizontally unfavorable
PATIENT STATUS	
History of periodontal disease	Yes
History of Bruxism	Yes (moderate)
Smoking	Casual/social
Smile Line	Moderate
PATIENT PREFERENCE	
Expenses (# of implants / type of prosthesis)
Loading	delayed/early/mediate

GUIDELINE re. IMPLANT DESIGN ASPECTS:

Clinicians may treat patients

1. by using tilted implants
2. by using a range of different implant designs and materials following bone grafting procedures (incl. sinus grafting).



Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with anatomical constraints, characterized by a non-optimal status but no/few demands re. treatment preference



studies: 22 (6)

RCT: 0

CCT: 0

Prospective CS: 2

Retrospective CS: 4

studies: 1

RCT: 0

CCT: 0

Prospective CS: 0

Retrospective CS: 1

**Literature, implant design aspects
Relevant SRs since 2010 (4+10):**

Tilted implants:

Patzelt ea, 2013

Menini ea., 2012

Del Fabbro ea, 2012

Monje ea, 2012

Minor / Sinus grafting

Corbella ea, 2013

Del Fabbro ea, 2013a, b

Taschieri ea, 2013

Tuna ea, 2012

Rickert ea, 2012

Jensen ea, 2012

Del Fabbro ea, 2011

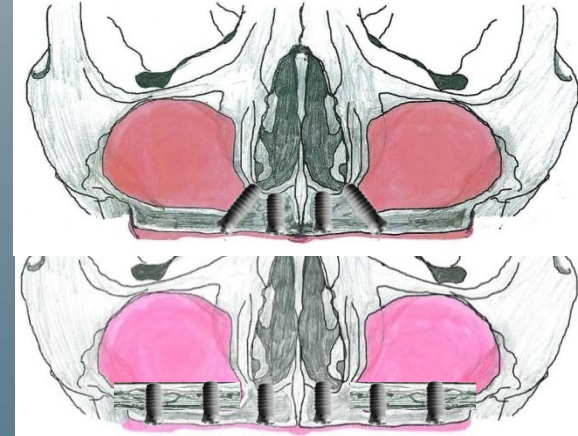
Chao ea, 2010

Esposito ea, 2010a, b

Klijn ea, 2010

Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with anatomical constraints, characterized by a non-optimal status but no/few demands re. treatment preference

"YELLOW" situation, managed by use of longer implants by *tilting* or combined with minor / sinus grafting



studies: 22* (6)

RCT: 0

CCT: 0

Prospective CS: 2

Retrospective CS: 4 + 1

* Performance

Axial i. better than (long) tilted i.: 2

Axial i. same as (long) tilted i.: 18

Axial i. worse than (long) tilted i.: 2

	YES	NO
Type	<i>Malo ea 2011a</i>	<i>Cavalli ea 2012</i> <i>Malo ea 2012</i> <i>Malo ea 2011b</i> <i>Agliardi ea 2009</i>
Diameter		<u><i>Zinser ea 12</i></u>
Length		<u><i>Zinser ea 12</i></u>
Surface		
Material		

Tilted implants examples -1



CAWOOD HOWELL 5-6

2x 10mm + 2 x 14mm 45° tilt
Mattson ea 1999



CAWOOD HOWELL 3-4

2x 10mm + 2 x 13-15mm 30-45° tilt
Fortin 2002

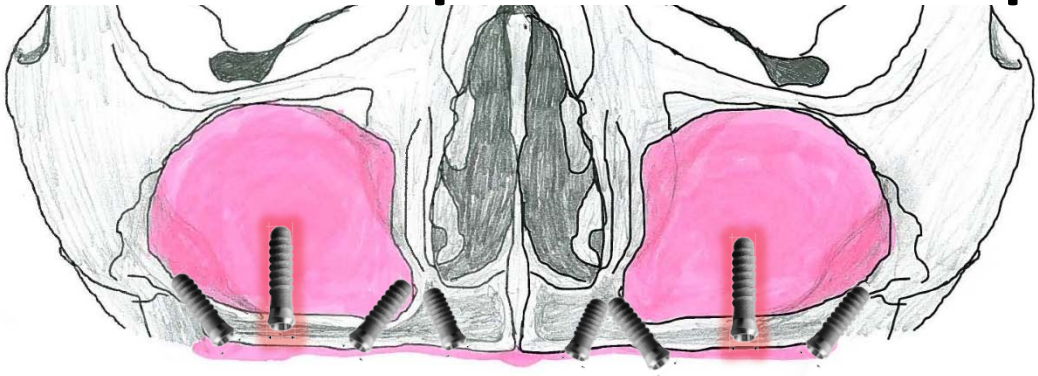


CAWOOD HOWELL 2

2x 14mm + 2 x 18mm 30° tilt
Mozzati ea 2012

Tilted implants examples -2

CAWOOD-HOWELL
4-5-6



2x 10mm 25-30° tilt +
4 x 13mm 25-30° tilt

- Krekmanov ea 2000a

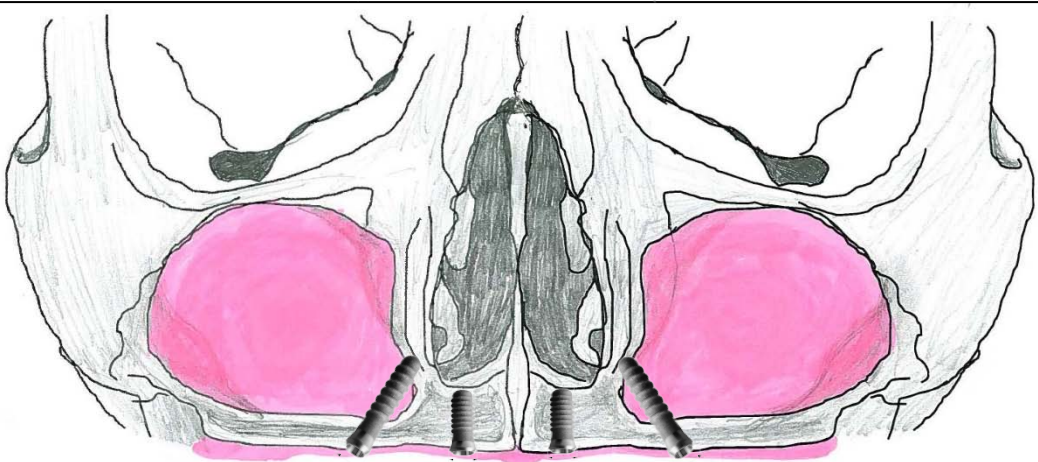
+ 2x 10mm + 4 x13mm+2 pal.vault

- Krekmanov ea 2000b



Post 2x 13mm 30-45° tilt +
Med 2x 13mm 30-45° tilt +
Aksial 2x10mm

- Agliardi ea 2009
- Degidi ea 2010



2x 10mm axial +
2 x 15mm, trans-sinus, 30-35° tilt

- Jensen ea 2012
- Testori ea 2013
- Malo ea 2013



“Red” situation / management



Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with major anatomical constraints, characterized by a non-optimal status and demands re. treatment preference

ANATOMICAL CONSTRAINTS	
Bone Height	< 8mm
Bone Width	< 4mm
Bone Quality (Lekholm/Zarb)-during drilling	IV
Bone augmentation / Fresh Extraction Sockets	Yes (simultaneously)
maxillo-mandibular Relation	Vertically and Horizontally unfavorable
PATIENT STATUS	
History of periodontal disease	Yes
History of Bruxism	Yes (severe)
Smoking	Heavy
Smile Line	High
PATIENT PREFERENCE	
Expenses (# of implants / type of prosthesis)	e.g. ≥ 4+ (fixed)
Loading	immediate

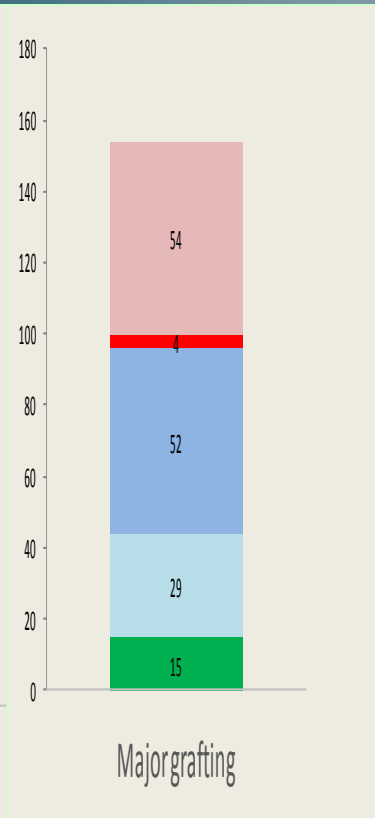
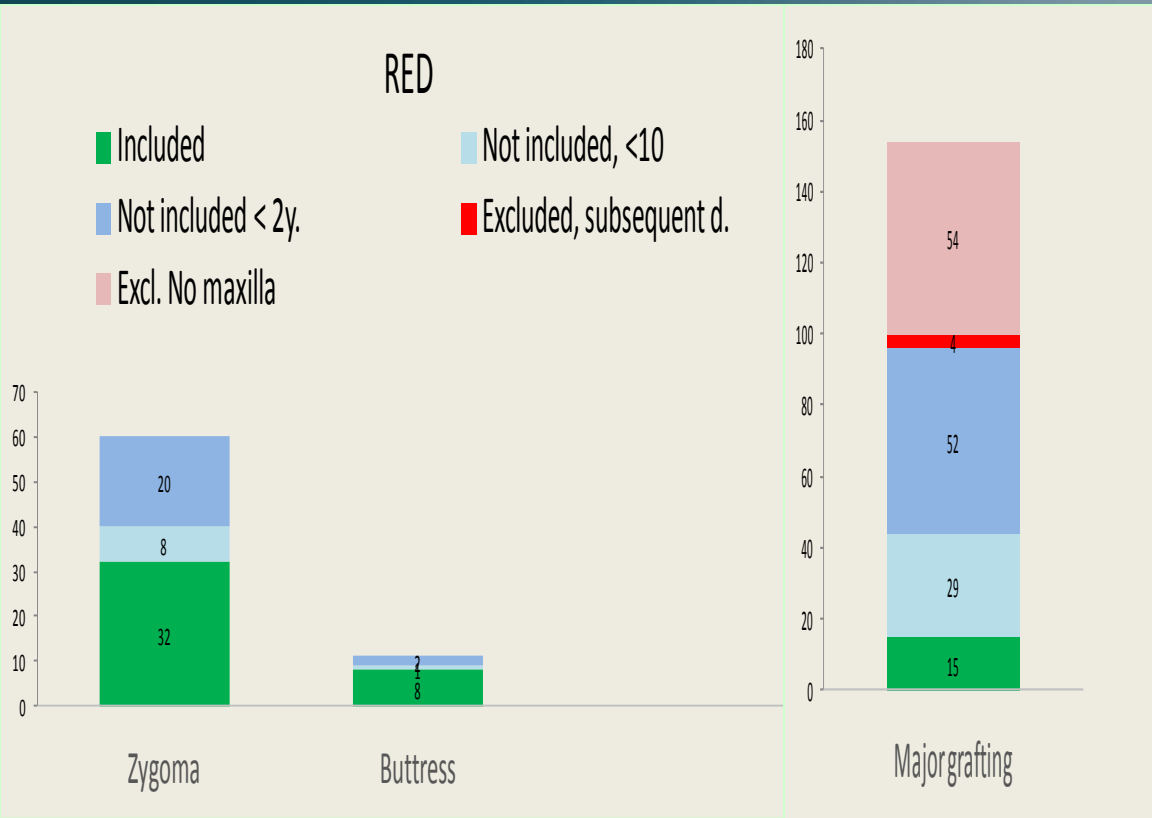
Clinicians may treat patients:

1. by using zygomatic implants.

2. by placing implants in the pterygoid or other bony buttresses.

3. by using a range of implant lengths (beyond 10mm) with simultaneous bone grafting procedures (incl. sinus grafting).

Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with major anatomical constraints, characterized by a non-optimal status and demands re. treatment preference



**Literature, implant design aspects
Relevant SRs since 2008 (15):**

Zygomatic implants

Goiato ea 2014

Esposito ea 2013

Chrcanovic ea 2012

Bone buttresses / pterygoid

Bidra ea 2011

Major grafting

Ricci ea, 2013

Clementini ea, 2012

Klein ea, 2011

Waasdorp ea, 2010

Retzepi ea, 2010

Chiapasco ea, 2009

Esposito ea, 2009a, b

Rocchietta ea, 2008

Donos ea, 2008

Blackburn ea, 2008

clinical studies: 32

RCT: 0

CCT: 1

Prospective CS: 10

Retrospective CS: 21

clinical studies: 8

RCT: 0

CCT: 0

Prospective CS: 0

Retrospective CS: 8

studies: 15

RCT: 0

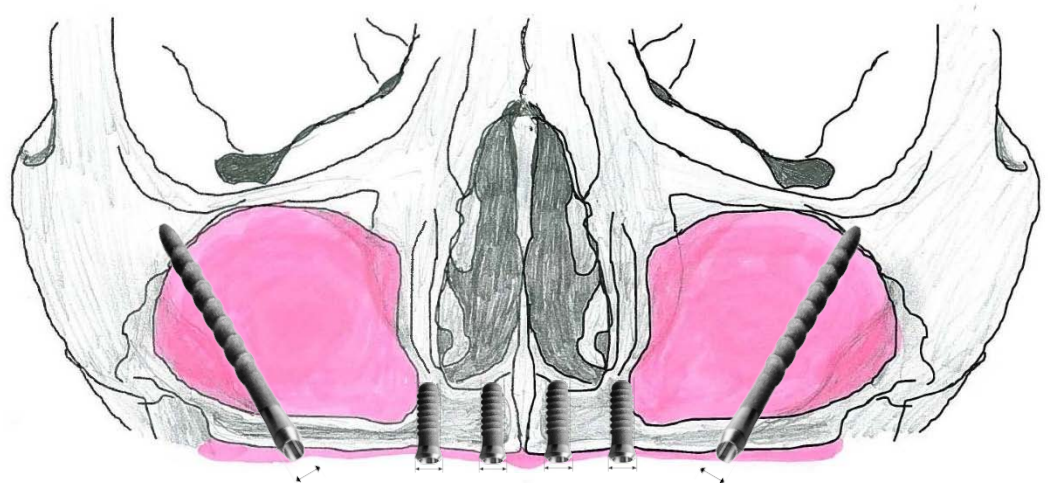
CCT: 2

Prospective CS: 5

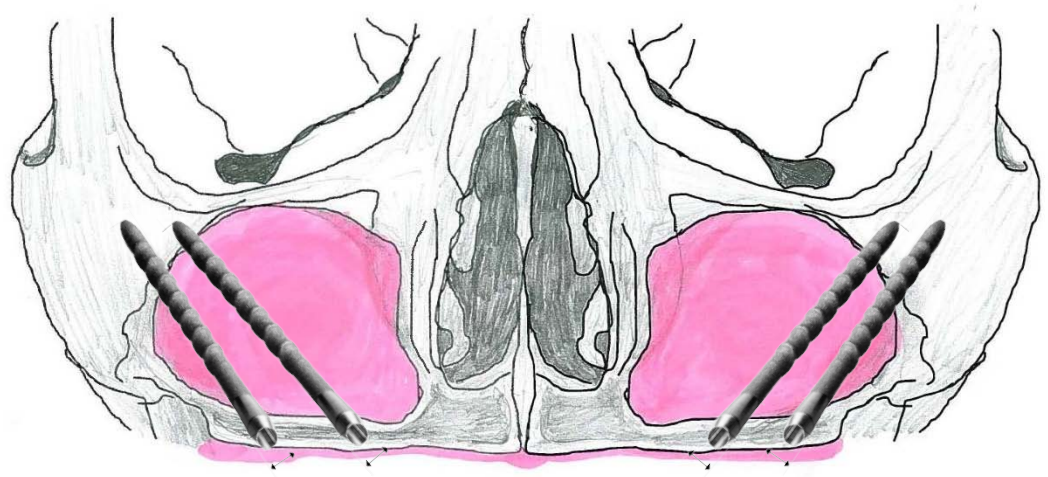
Retrospective CS: 8

Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with major anatomical constraints, characterized by a non-optimal status and demands re. treatment preference

“RED” situation, managed by use of zygoma i.



Trans-sinus zygomatic
2-4 x 10mm + 2 x 42mm
• Bedrossian ea 2002

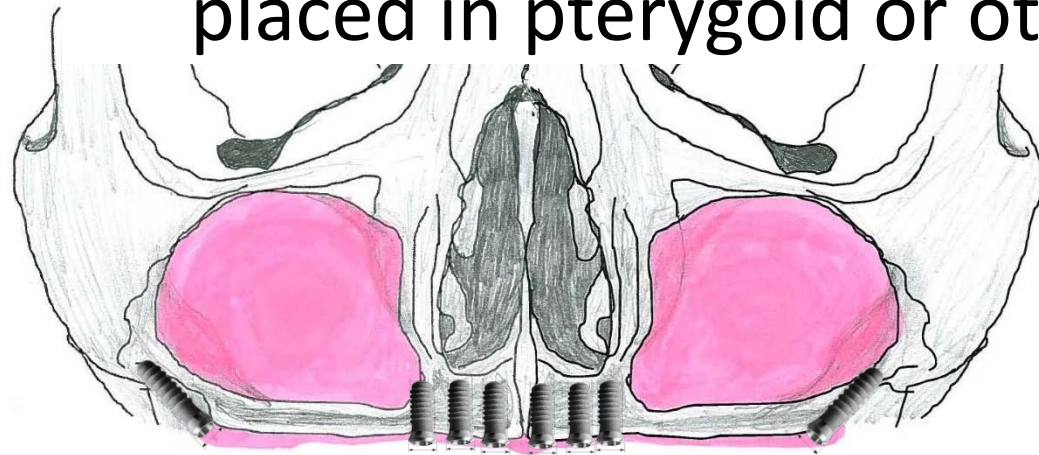


Extra-sinus zygomatic
(Stella&Warner 2000)
• Yates ea 2013

Trans/Extra-sinus zygomatic
4 x 42mm
• Duarte ea 2007

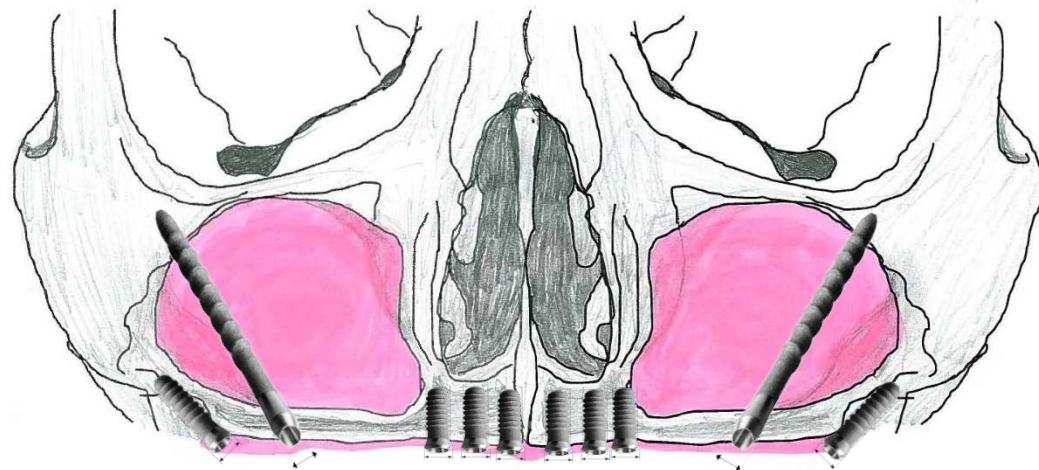
Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with major anatomical constraints, characterized by a non-optimal status and demands re. treatment preference

"RED" situation, managed by use of implants placed in pterygoid or other bony buttresses



EXAMPLES

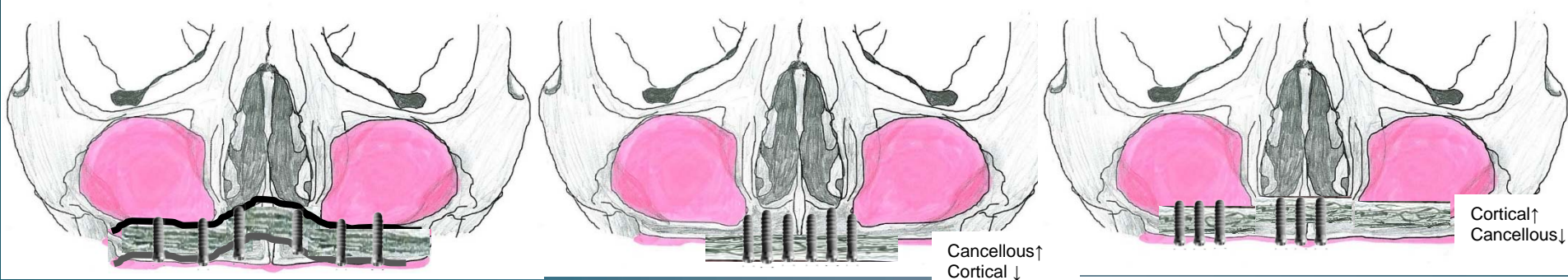
6x 10mm + 2 pterygoid 15mm
Balshi et al. 1999



6x 10mm + 2 pterygoid 15mm
+ 2 zygomatic 42mm
Balshi et al. 2005
(Teeth-in-an-hour – 10 implants)

"RED" situation, Bone augmentation, 1 or 2 stage preceding implants

Predominantly:
Cawood-Howell Class VI



1/2 stage: LeFort 1 Fracture & Interpositional fixation
+ 6x 20mm implants
Sailer 1989
Nyström /Lundgren 1997

1 stage onlay block
+ 6x 15/18/20mm
Becktor ea 2002

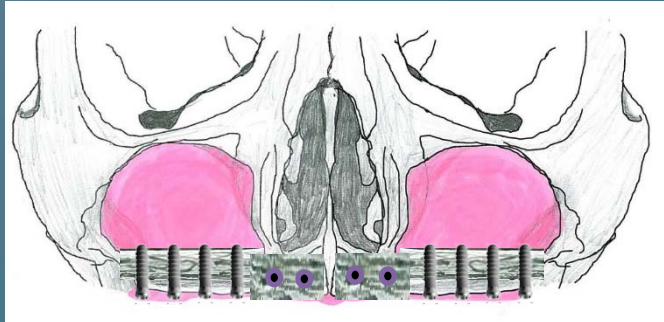
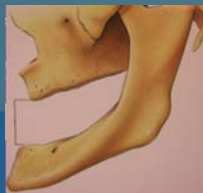
1/2 stage inlay sinus(+nasal)
blocks
+ 9 x 18mm implants
Keller ea 1994, 1999a,b

Most common: Cortico-cancellous bone from

- Iliac Crest
- (Calvarium)

Full-arch,
or
Segmental

Common dilemma: Pseudo-Class III
Discrepancy that needs correction



2 stage Hor. Sinus inlay +/- Block onlay

Target condition: Healthy, non-medically compromised patient, having an edentulous maxilla with major anatomical constraints, characterized by a non-optimal status and demands re. treatment preference

"RED" situation, managed by major grafting & *one/two* step surgery

	YES	NO	UNCERTAIN
Type	<u>Lekholm ea, 99</u>	<u>Watzek ea, 98</u>	<u>Pinholt, 03</u> <u>Hallman ea, 05</u>
Length	<u>Becktor ea, 02, 04</u> <u>Keller ea, 94, 99a, 99b</u> <u>Neukam, 96</u>	<u>Dasmah ea, 11</u> <u>Chiapasco ea, 07</u> <u>Sjöström ea, 07</u>	<u>Nyström ea, 97</u> <u>Köndell ea, 96</u>
Diameter			
Surface			
Material			

studies: 15

RCT: 0

CCT: 2

Prospective CS: 5

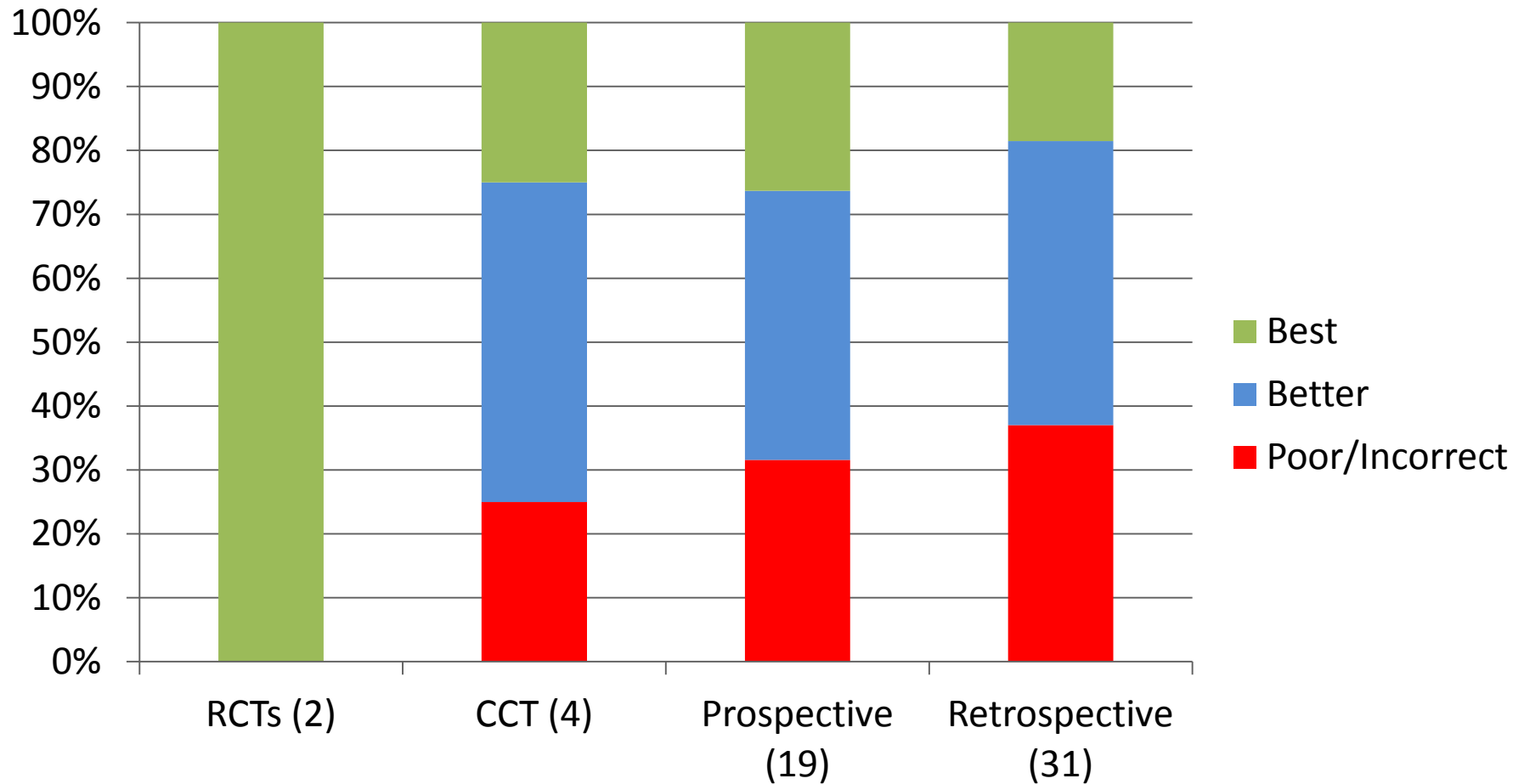
Retrospective CS: 8

STATISTICAL CONSIDERATIONS

2014 SUMMIT
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The quality of the statistics



*Included papers in categories 1, 2, 5 & 6, (n=56 papers)

General comment FOR THOSE CONSIDERING REPORTING: CORRECT STATISTICS IS ESSENTIAL!

	1 -GOOD	2 -BAD	3 -UGLY
STRATEGY	1 -GOOD	2 -BAD	3 -UGLY
RECRUIT/REPORT	LIMIT TO MAXILLA	ALL CATEGORIES	ALL CATEGORIES
STATISTICS	KAPLAN-MEIER+ LOGRANK+ COX REGRESSION	ATTEMPTS OF MULTIVARIATE STATS	“DESCRIPTIVE” ONLY / UNIVARIATE STATISTICS
DISADVANTAGE/ SOLUTION	RECRUITMENT TIME / MULTICENTRE	OFTEN VIOLATION OF UNDERLYING STAT.ISTICAL ASSUMPTIONS / GLM (PARTLY)	NONE





RISK OF SELECTION BIAS WHEN UNDERTAKING BIBLIOGRAPHIC SEARCHES

2014 SUMMIT
Academy of Osseointegration



An expert search algorithm example

("Dental Implants"[Mesh:noexp] OR "Dental Implantation, Endosseous"[Mesh:noexp] OR "Blade Implantation"[Mesh] OR ("Dentistry"[Mesh] OR "dental"[Title/Abstract]))

AND

("Osseointegration"[Mesh] OR "osseointegration"[Title/Abstract])) OR ("dental"[Title/Abstract]

AND

("implant"[Title/Abstract] OR "implants"[Title/Abstract] OR "implantation"[Title/Abstract]))

AND

("Denture, Overlay"[Mesh] OR "Denture, Complete"[Mesh] OR "Denture, Partial, Removable"[Mesh] OR "Dental Prosthesis, Implant-Supported"[Mesh] OR "Denture, Fixed"[Mesh:noexp] OR "denture"[Title/Abstract] OR "prosthesis"[Title/Abstract])

AND

("edentulous"[Title/Abstract] OR "Jaw, Edentulous"[Mesh:noexp] OR "Mouth, Edentulous"[Mesh:noexp] OR "edentulism"[Title/Abstract]) NOT "partially edentulous"[Title/Abstract] NOT ("review"[Publication type] OR systematic[sb])

AND

"Maxilla" [MeSH]

BEWARE OF RISK OF SELECTION BIAS WHEN BIBLIOGRAPHIC DATABASES ARE SEARCHED

- MEDLINE / EMBASE / Science Citation Index / Web of Science / (LILACS /Pascal) / Scopus / Cochrane CENTRAL?
- No search can identify all studies vz. gold standard sets. E.g., Science Citation Index, EMBASE & BIOSIS contain studies that are not on MEDLINE
- 20 - 40% of relevant studies are never identified by searching MEDLINE – regardless of expert search algorithms
- Reflist handsearching is always required
- Lists of included and excluded studies
- Whiting P, et al. J Clin Epidemiol 2008;61:357
- McKibbon et al. Health Info Libr J 2009;26:187
- AMSTAR instrument

