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3D AUGMENTATION

MÖGLICHKEITEN UND GRENZEN VON DIGITALEN VERFAHREN IN DER VERTIKALEN UND LATERALEN AUGMENTATION

Dentsply Sirona | PEERS

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Erfolg durch Wissen

INTERESSENKONFLIKT

- APW/DGZMK
- HONORARY AMBASSADOR SLOW DENTISTRY
- PRO BONO FÄLLE MIT GEISTLICH UND BEGO
- BEZAHLTE VORTRÄGE FÜR BEGO, GEISTLICH, MECTRON, STRAUMANN, NOBEL, DENTSPLY, ETC
- GREENVIU GMBH

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what is the benefit of a digital workflow in surgery ?

Quicker ?
Better ?
More Precise ?
More sustainable ?
Reduces cost ?
Less invasive ?
Safer ?
Communication ?

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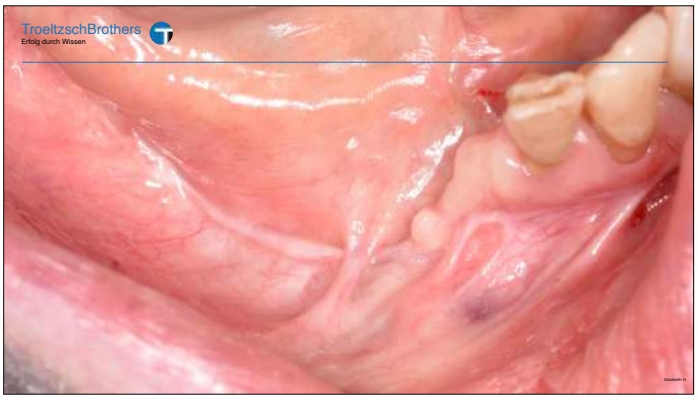
Erfolg durch Wissen



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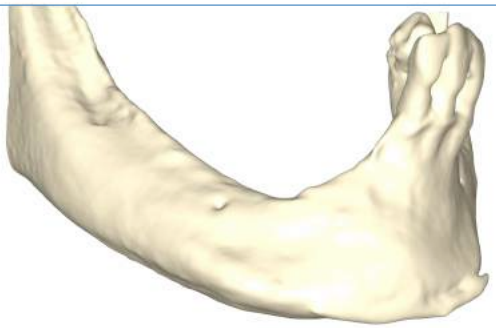
Erfolg durch Wissen



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1. Warum planen wir welches Implantat ?
2. Augmentationen - Protokolle
3. Komplikationsmanagement
4. Nachhaltige Aspekte
5. Fazit

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Erfolg durch Wissen

Wann braucht es eine Augmentation
und
wann kann ein kürzeres / längeres
Implantat gewählt werden ?

ZUSAMMENFASSUNG

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Erfolg durch Wissen

Implantate länger als 6 mm
und breiter als 3 mm

Standart:
Durchmesser um **4mm**
Länge **8mm** und mehr
(abhängig von weiteren Faktoren)

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Success through knowledge

Influence of Dental Implant Diameter and Bone Quality on the Biomechanics of Single-Crown Restoration. A Finite Element Analysis
(2021)

Anitua et al.

https://pubmed.ncbi.nlm.nih.gov/34562977/

Results: The maximum stress value was obtained for the Ø3.3 implant in Type IV bone (235 MPa), while the lowest value was obtained for the Ø4.75 implant and in Type 0-I bone (41 MPa). Regardless of the implant diameter, an improvement in bone quality produced a reduction in bone stress. The same effect was observed as the implant diameter was increased, being this effect even more pronounced.

Conclusions: Implant diameter has an important effect on bone stress, with a reduction in stress as the implant diameter increases.

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Influence of Implant Tilting and Length on the Biomechanics of Single-Tooth Restoration: A Finite Element Analysis in Atrophic Mandible
(2022)

Anitua et al.

https://pubmed.ncbi.nlm.nih.gov/35621530/

The highest increase was in the case of implant tilting at 45° (by 1300%). The use of extra-short implants did not produce a significant increase in Von Mises stress in bone. Moreover, the length of the implant did not affect the stress value in bone types I and II.
Based on the obtained results, an axially placed short implant would be a better option than titling a standard-length implant to support a crown restoration in an atrophic mandible from a biomechanical point of view.

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Peri-implantitis Update: Risk Indicators, Diagnosis, and Treatment

plaque, smoking, history of periodontitis, surface roughness, residual cement, emergence angle >30 degrees, radiation therapy, keratinized tissue width, and function time of the implant, sex, and diabetes.

Rokoya et. al, 2020

https://pubmed.ncbi.nlm.nih.gov/32889746/

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Erfolg durch Wissen

ZUSAMMENFASSUNG

- Implantate unter 6mm Länge und unter 3mm Durchmesser haben weniger Daten/schlechteres Outcome.
- Implantate unter 8mm Länge und unter 4mm Durchmesser haben realistisch 5 Jahres Daten.
- Dimensionen sind weniger wichtig als die Stabilität !
- Fragen der Hygiene und technischen Zuverlässigkeit sind bei dünnen Implantaten insbesondere bei breiten prothetischen Aufbauten offen.

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1. Warum planen wir welches Implantat ?
2. Augmentationen - Protokolle
3. Komplikationsmanagement
4. Implantatbezogene Analysen
5. Fazit

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Contents lists available at ScienceDirect

Journal of Cranio-Maxillo-Facial Surgery

journal homepage: www.jcmfs.com

ELSEVIER

Clinical efficacy of grafting materials in alveolar ridge augmentation: A systematic review☆

Markus Troeltzsch [a,*], Matthias Troeltzsch [b], Philipp Kauffmann [a], Rudolph Gruber [a], Phillipp Brockmeyer [a], Norman Moser [a], Anna Rau [c], Henning Schliephake [a]

[a] Department of Maxillofacial Surgery (Head: Prof. Dr. Dr. H. Schliephake), University of Goettingen, Germany
[b] Department of Maxillofacial Surgery, Ludwig – Maximilians – University of Munich, Germany
[c] Department of Anesthesiology, University of Goettingen, Germany

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Total: 23638 studies

Included: 184 titles with:

7473 applications of graft material in 6182 patients

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S2k-Leitlinie (Langversion)

Implantologische Indikationen für die Anwendung von Knochenersatzmaterialien

AWMF-Registernummer: 083-009

Autoren:
Markus Tröltzsch
Peer W. Kämmerer
Andreas Pabst
Matthias Tröltzsch
Philipp Kauffmann
Eik Schiegnitz
Phillipp Brockmeyer
Bilal Al-Nawas

Included: 581 titles

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Erfolg durch Wissen

Defekt - Biologie

+++ Regenerationspotential ---

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Erfolg durch Wissen

Defekt - Biologie

+++ Regenerationspotential ---

TroeltzschBrothers
Erfolg durch Wissen

Defekt - Biologie

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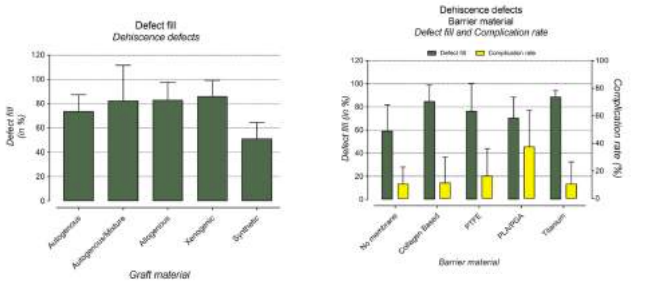

Troeltzsch M, et al., Clinical efficacy of grafting materials in alveolar ridge augmentation: A systematic review; Journal of Cranio-Maxillo-Facial Surgery 2016

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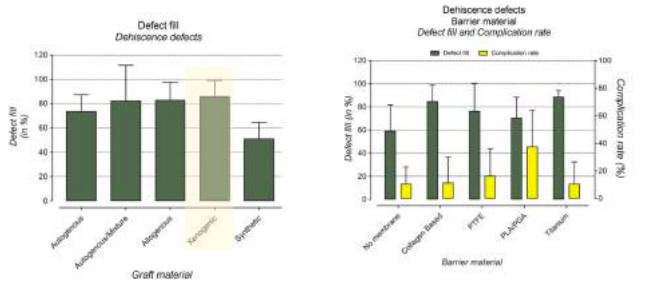
Success through knowledge



Troeltzsch M, et al., Clinical efficacy of grafting materials in alveolar ridge augmentation: A systematic review; Journal of Cranio-Maxillo-Facial Surgery 2016

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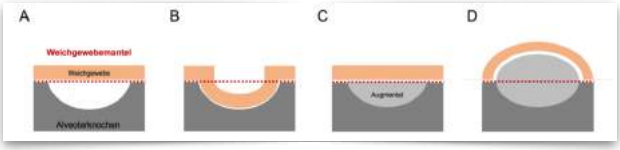
Erfolg durch Wissen

DEFEKT – BIOLOGIE



Autoren:
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S2k-Leitlinie (Langversion)
Implantologische Indikationen für die Anwendung von Knochenersatzmaterialien
AWMF-Registernummer: 083-009

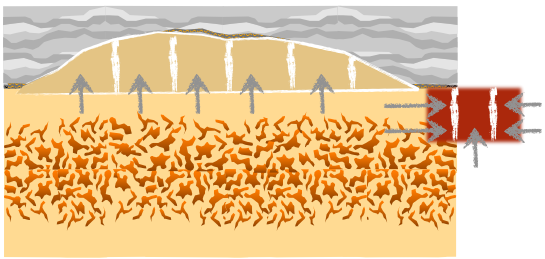
https://www.uniklinik-mainz.de/klinik/unsere-klinik/mitarbeiter/ueber-200/nr-100/bilder-pruefbuerten-der-mitarbeiter/prof-dr-dr-bilal-al-nawas.html

TroeltzschBrothers
Erfolg durch Wissen

Defekt - Biologie

+++ Regenerationspotential ---

TroeltzschBrothers
Erfolg durch Wissen



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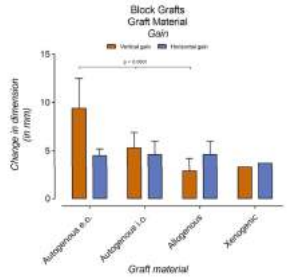
Erfolg durch Wissen



Augmentation transversaler/horizontaler und vertikaler Defekte mit **BLOCK** Material

Geringer Einfluss des Barrierematerials

Achtung: Horizontale Stecken sind limitiert durch die lokale Notwendigkeit --> selten mehr als 4mm nötig

Troeltzsch M, et al., Clinical efficacy of grafting materials in alveolar ridge augmentation: A systematic review; Journal of Cranio-Maxillo-Facial Surgery 2016

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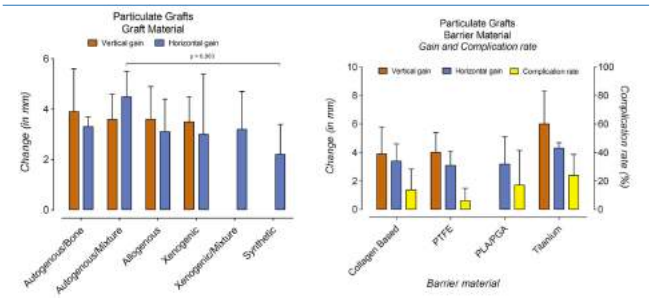
Erfolg durch Wissen



Troeltzsch M, et al., Clinical efficacy of grafting materials in alveolar ridge augmentation: A systematic review; Journal of Cranio-Maxillo-Facial Surgery 2016

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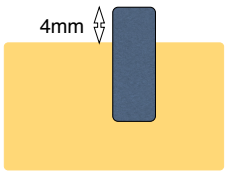
AUGMENTATION

Bis 2mm: Partikulär und Membran

2-4mm: Tenting Technik

4mm+: Ti-Mesh



Troeltzsch et al. 2016
Troeltzsch et al. 2020

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Häufigste: Ridge Preservation !

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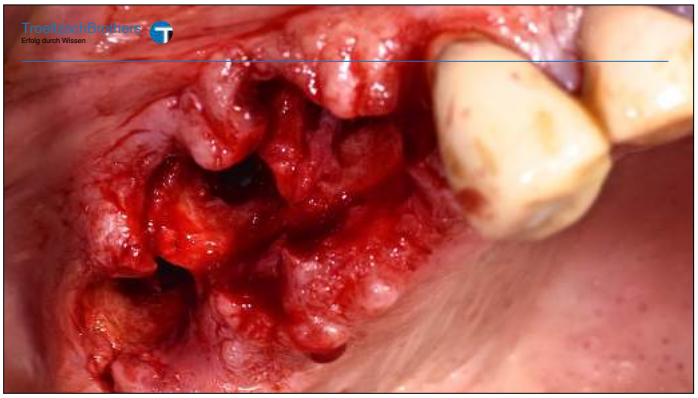
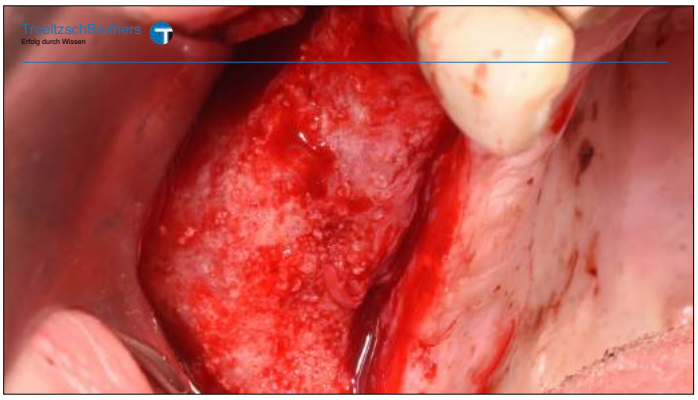
Case:
Complex Ridge Preservation
in the Maxilla





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Case:
Augmentation 3.5mm

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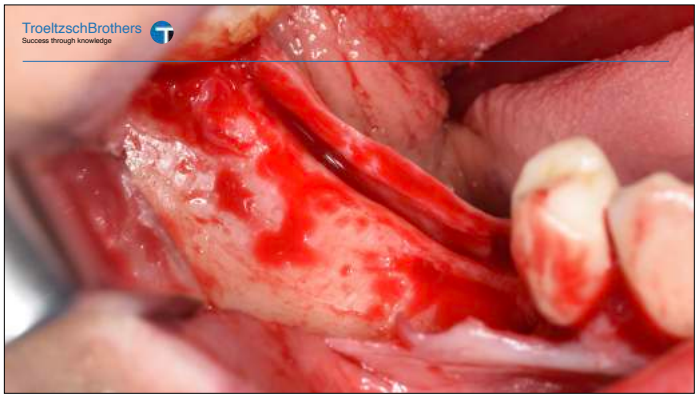
Unser Workflow
1. Wax Up
2. Planungsschablone
3. DVT und virtuelle Planung
4. Entscheidung Augmentation ja/ nein - welche:

Bis 2mm: Partikulär und Membran

2-4mm: Tenting Technik

4mm+: Ti-Mesh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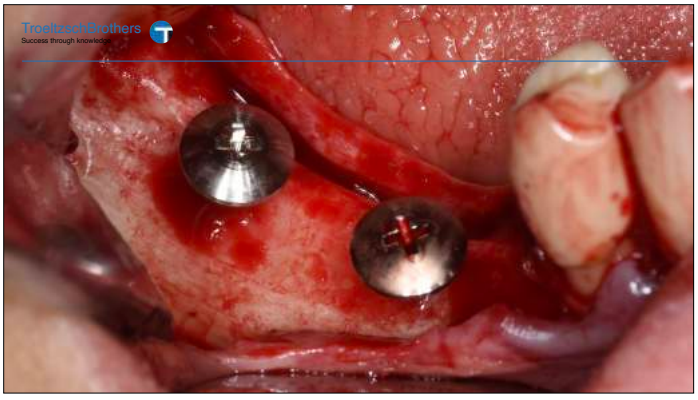
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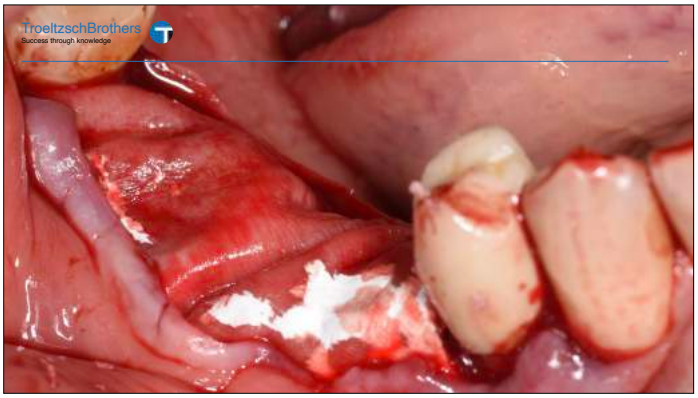

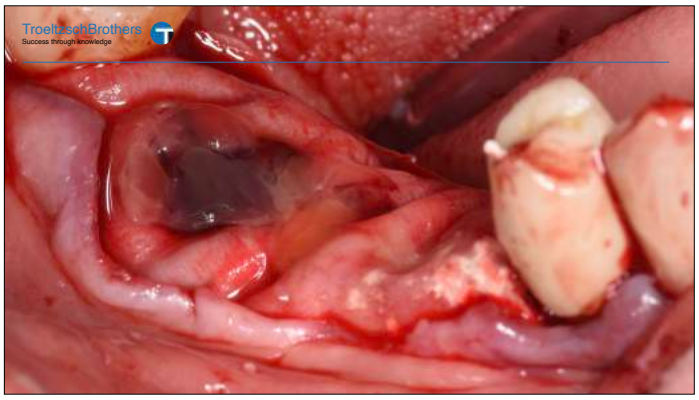

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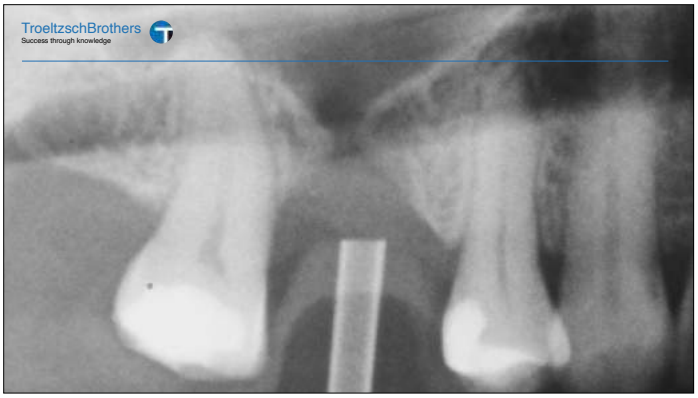
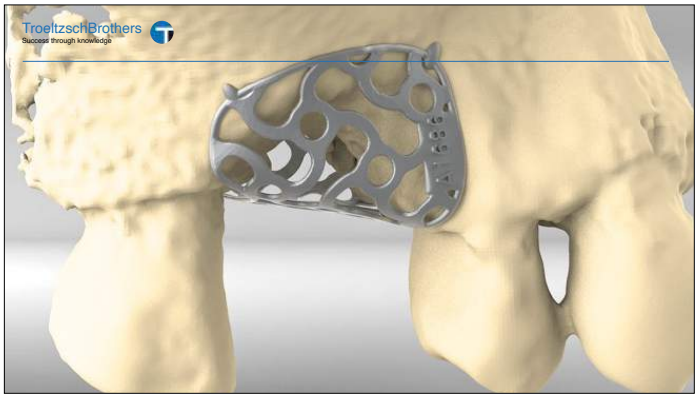
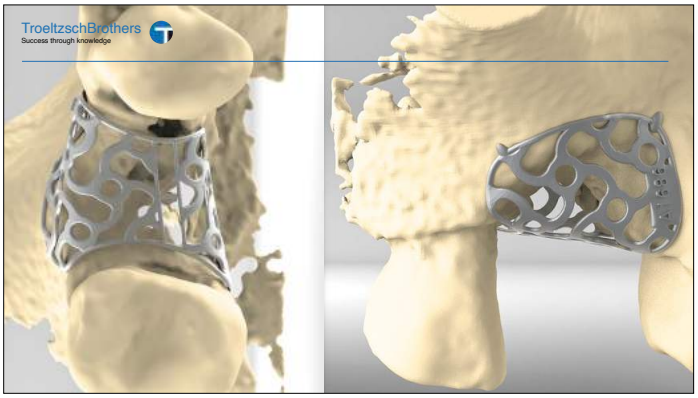
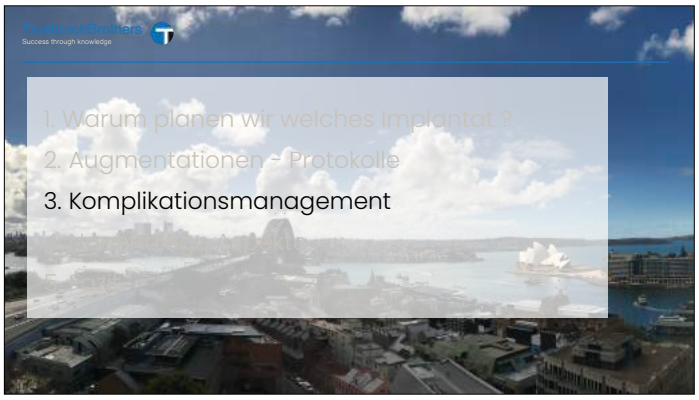
Case:
sinuslift & lateral & vertical augmentation with soft tissue enhancement









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Complications 1

Int J Periodontics Restorative Dent. 2005 Feb;25(1):19-25.

Reduction of autogenous bone graft resorption by means of bio-oss coverage: a prospective study.

Mazzocna C[1], Benetta M, Salina S, Santoro F.

Author information

1 Department of Oral Surgery, University of Milan School of Dentistry.

Abstract

Bone grafting may be required prior to implant placement, at the time of implant placement, or subsequent to it. The aim of this study was to compare the healing of onlay block grafts when deproteinized bovine bone coverage was used with the healing of the grafts without such coverage. The purpose was a clinical evaluation of deproteinized bovine bone's ability to reduce grafted bone resorption. The results indicated that bovine bone can be placed over grafted areas, taking advantage of its osteoconductive properties and compensating for the natural bone resorption caused by remodeling.

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Int J Oral Maxillofac Implants. 2002 Mar-Apr;17(2):236-48.

The use of ramus autogenous block grafts for vertical alveolar ridge augmentation and implant placement: a pilot study.

Prousaefs P[1], Lozada J, Kleinman A, Rohrer MD.

Author Information

1 School of Dentistry, Graduate Program in Implant Dentistry, Loma Linda University, California 92350, USA. pProusaefs@hotmail.com

Abstract

PURPOSE: This study presents a clinical, radiographic, laboratory, and histologic/histomorphometric analysis of the use of mandibular ramus block autografts for vertical alveolar ridge augmentation and implant placement.

MATERIALS AND METHODS: Autogenous block autografts were fixed at the recipient site with fixation screws while a mixture of autogenous bone marrow and inorganic bovine material (Bio-Oss) was used at the periphery. All grafts appeared well incorporated at the recipient site during reentry surgery.

RESULTS: Radiographic measurements revealed an average of 6.12 mm vertical ridge augmentation 1 month after surgery and 5.12 mm 4 to 8 months after surgery. Laboratory volumetric measurements revealed an average of 0.91 mL alveolar ridge augmentation 1 month after surgery and 0.75 mL 6 months postoperatively. Linear laboratory measurements revealed 6.12 mm of vertical ridge augmentation 1 month postoperatively and 4.37 mm 4 to 8 months after surgery. Histologic evaluation indicated signs of active remodeling in all the specimens. Histomorphometric analysis of the peripheral particulate bone indicated bone present at 54.33% of the grafted area, while 42.17% of the area was occupied by fibrous tissue and 23.50% by residual Bio-Oss particles.

DISCUSSION: The results demonstrated the potential of mandibular block autografts harvested from the ascending ramus to maintain their vitality. Volumetric resorption rate of 17.58% and radiographic resorption rate of 16.34% were in accordance with previously published literature. Early exposure appeared to compromise the results, while late exposures did not affect the vitality of the block autografts.

CONCLUSION: Mandibular block autografts can maintain their vitality when used for vertical alveolar ridge augmentation. Inorganic bovine mineral (Bio-Oss) can be used at the periphery of the block graft when mixed with autogenous bone marrow.

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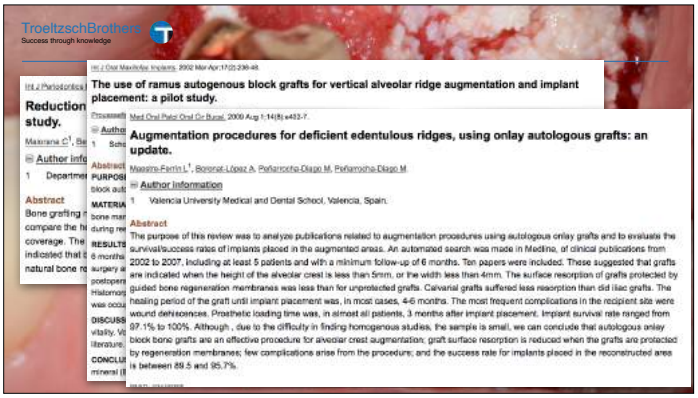

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The use of ramus autogenous block grafts for vertical alveolar ridge augmentation and implant placement: a pilot study.

Med Oral Patol Oral Cir Bucal. 2008 Aug 1;14(8):e483-7.

Augmentation procedures for deficient edentulous ridges, using onlay autologous grafts: an update.

Maestre-Ferrin L[1], Boronat-López A, Peñarrocha-Diago M, Peñarrocha-Diago M.

Author Information

1 Valencia University Medical and Dental School, Valencia, Spain.

Abstract

The purpose of this review was to analyze publications related to augmentation procedures using autologous onlay grafts and to evaluate the survival/success rates of implants placed in the augmented areas. An automated search was made in Medline, of clinical publications from 2002 to 2007, including at least 5 patients and with a minimum follow-up of 6 months. Ten papers were included. These suggested that grafts are indicated when the height of the alveolar crest is less than 5mm, or the width less than 4mm. The surface resorption of grafts protected by guided bone regeneration membranes was less than for unprotected grafts. Calvarial grafts suffered less resorption than did iliac grafts. The healing period of the graft until implant placement was, in most cases, 4-6 months. The most frequent complications in the recipient site were wound dehiscences. Prosthetic loading time was, in almost all patients, 3 months after implant placement. Implant survival rate ranged from 97.1% to 100%. Although , due to the difficulty in finding homogenous studies, the sample is small, we can conclude that autologous onlay block bone grafts are an effective procedure for alveolar crest augmentation; graft surface resorption is reduced when the grafts are protected by regeneration membranes; few complications arise from the procedure; and the success rate for implants placed in the reconstructed area is between 89.5 and 95.7%.

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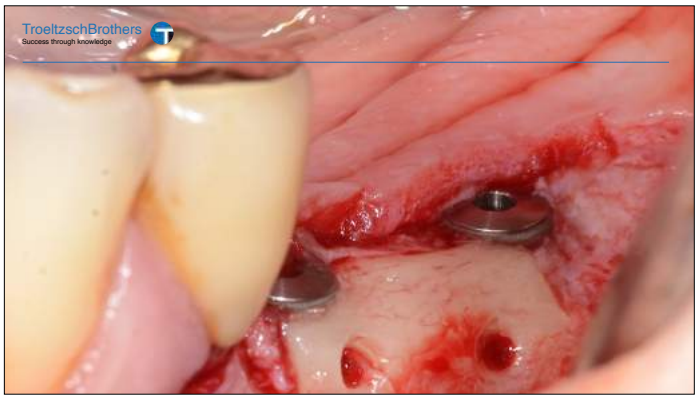

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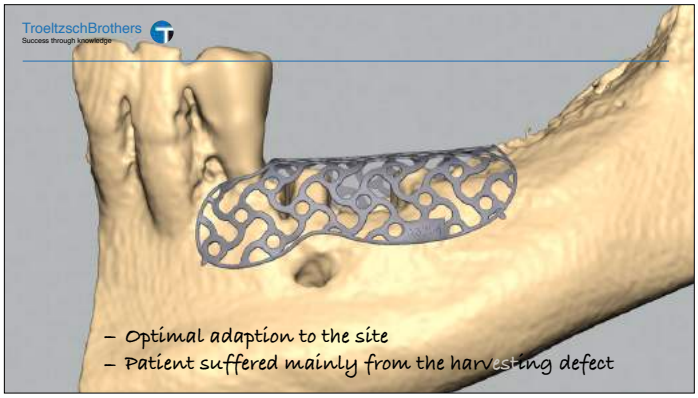

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Complications 3

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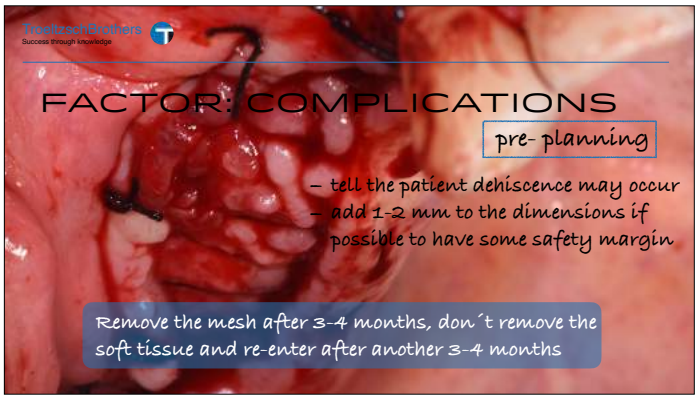
FACTOR: COMPLICATIONS

pre- planning

- tell the patient dehiscence may occur
- add 1-2 mm to the dimensions if possible to have some safety margin



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FACTOR: COMPLICATIONS

pre- planning

- tell the patient dehiscence may occur
- add 1-2 mm to the dimensions if possible to have some safety margin

Remove the mesh after 3-4 months, don´t remove the soft tissue and re-enter after another 3-4 months

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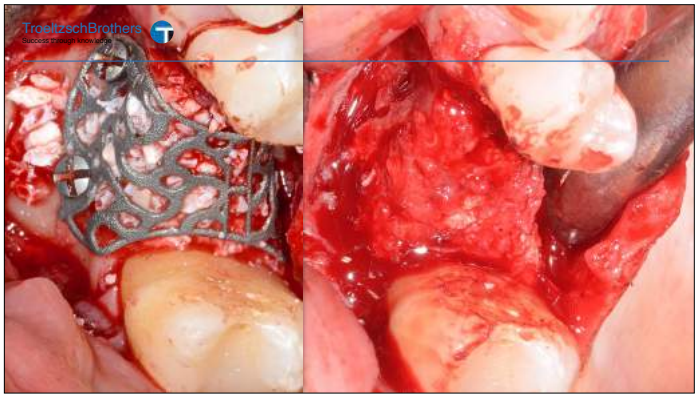
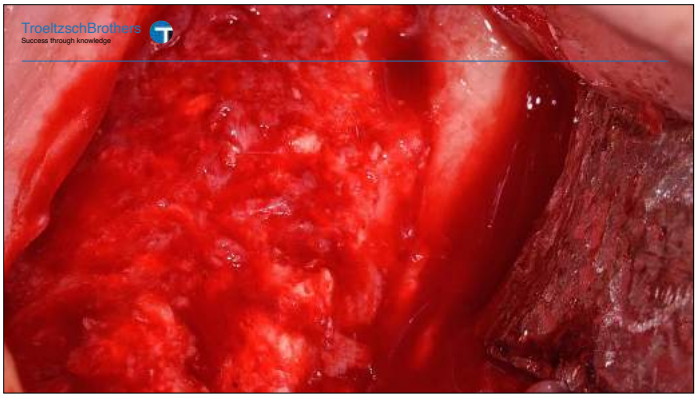
Individual Mesh
bone quality



TroeltzschBrothers
Success through knowledge



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Success through knowledge

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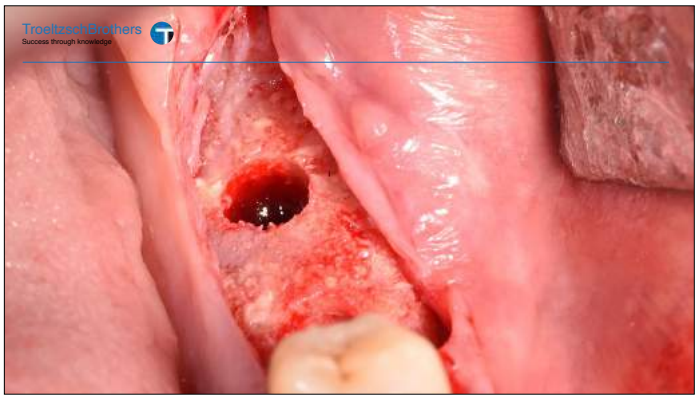
Success through knowledge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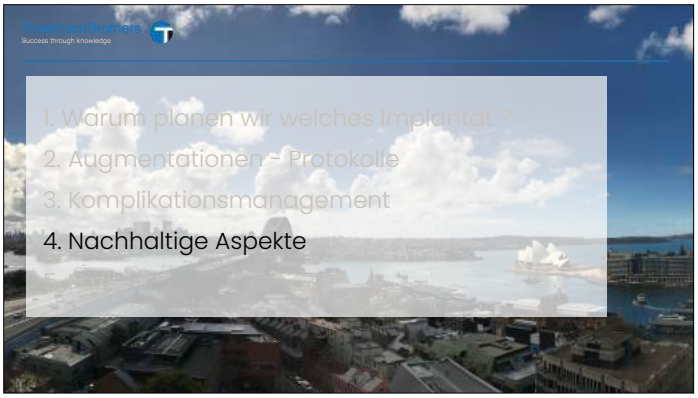
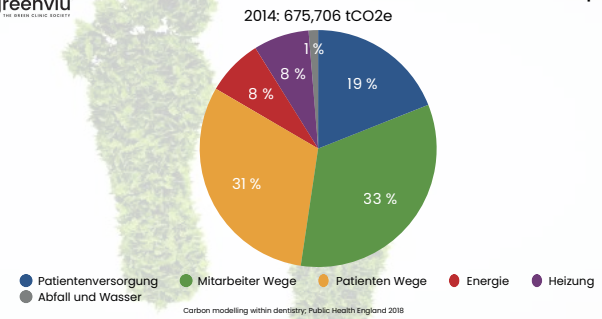

TroeltzschBrothers
Success through knowledge
1. Warum planen wir welches Implantat ?
2. Augmentationen - Protokolle
3. Komplikationsmanagement
4. Nachhaltige Aspekte

Footprint



Reduzieren

Qualität

Hochqualitative Behandlung verringert die Schritte und ist damit nachhaltig und präventiv

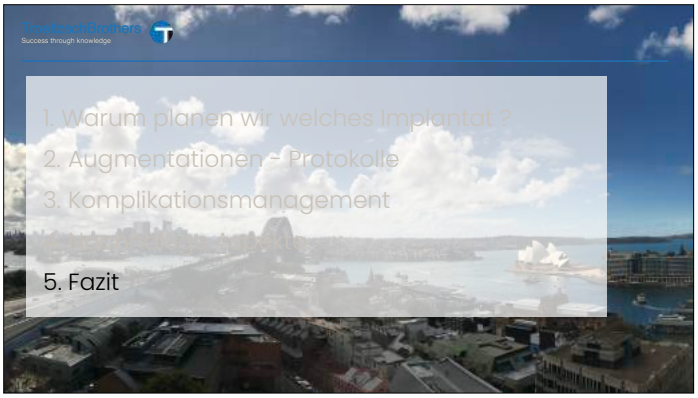
Prävention

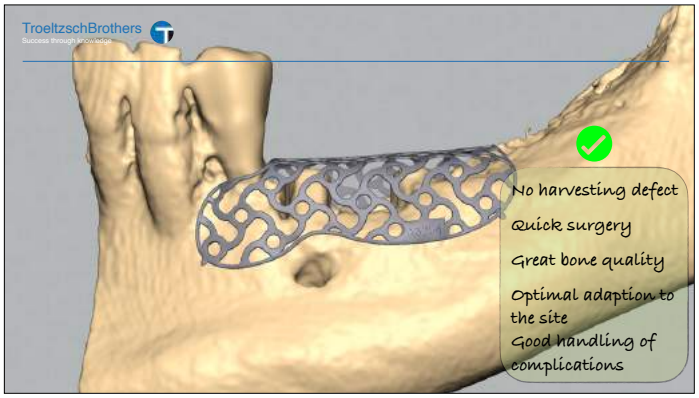
Eine Erkrankung zu verhindern ist die nachhaltigste Art diese zu Behandeln.

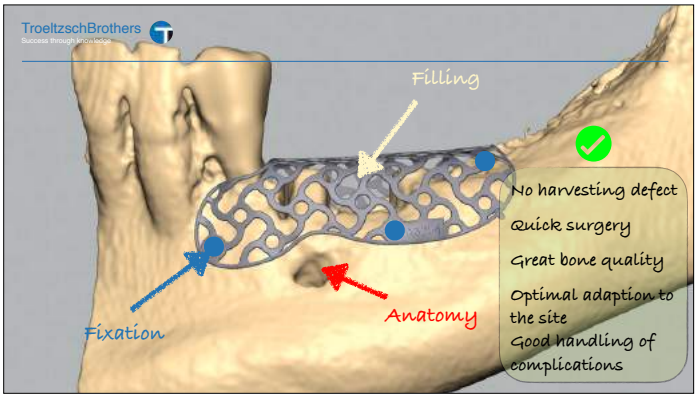
greenviu®
THE GREEN CLINIC SOCIETY

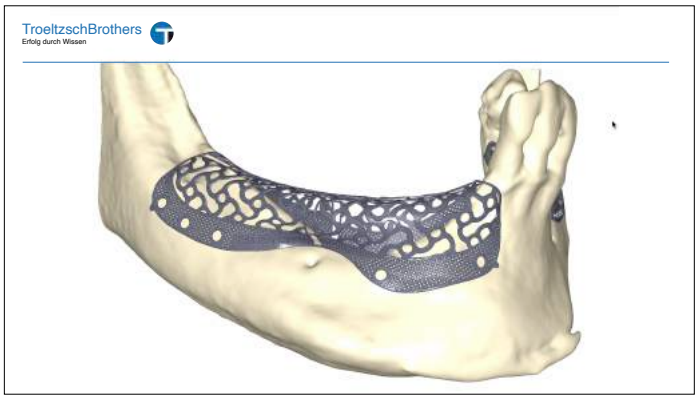
In der Vollmitgliedschaft:

- greenviu footprint calculator
- Individuelle Berechung und Verbesserungstipps
- Nachhaltiger Hygiene Kurs
- NEU! Ausbildung zum Nachhaltigkeitsmanager
- Produktrabatte über unsere Partner
- und vieles mehr…




TroeltzschBrothers
Success through knowledge
No harvesting defect
Quick surgery
Great bone quality
Optimal adaption to the site
Good handling of complications


TroeltzschBrothers
Success through knowledge
Filling
Fixation
Anatomy
No harvesting defect
Quick surgery
Great bone quality
Optimal adaption to the site
Good handling of complications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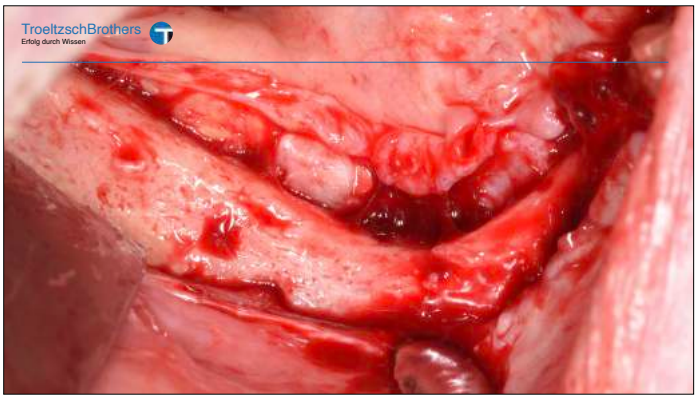
Erfolg durch Wissen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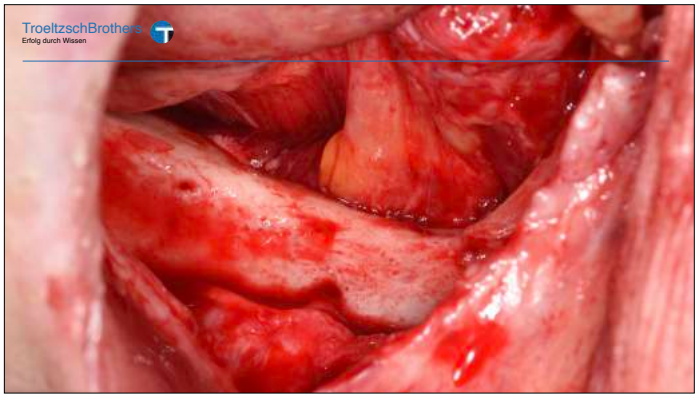
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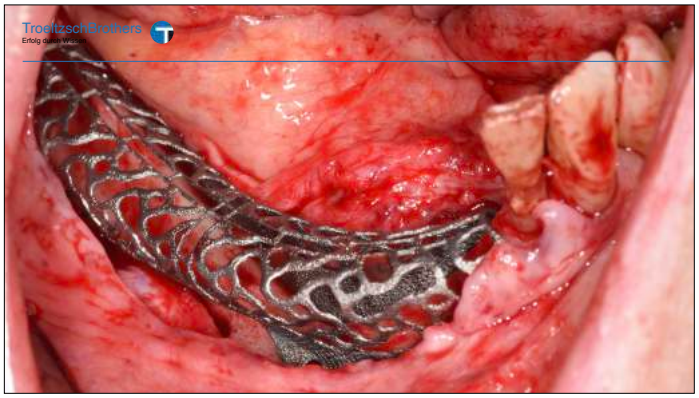
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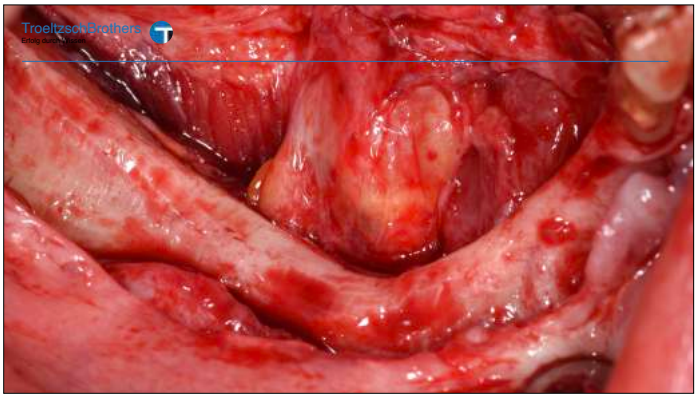
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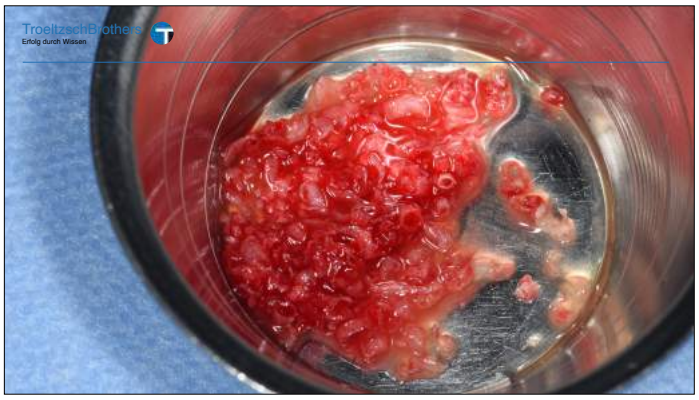
Erfolg durch Wissen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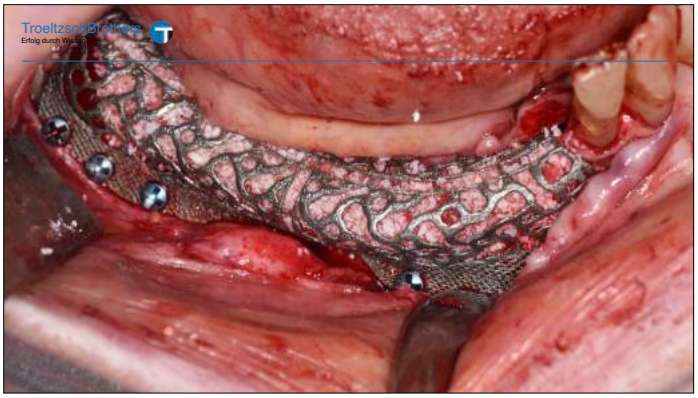
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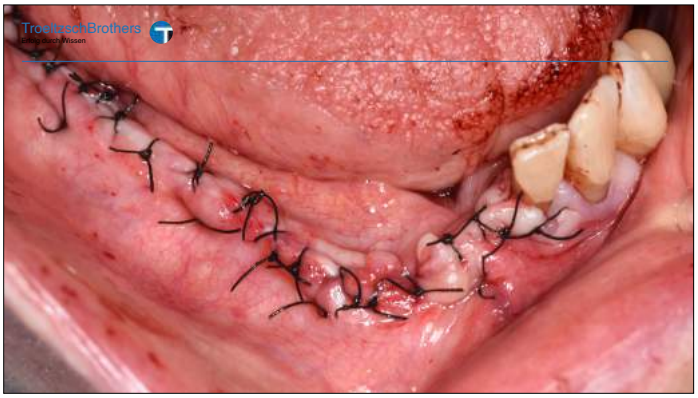
Erfolg durch Wissen



TroeltzschBrothers
Success through knowledge

what is the benefit of a digital workflow
in surgery ?

- Quicker ?
- Better ?
- More Precise ?
- More sustainable ?
- Reduces cost ?
- Less invasive ?
- Safer ?
- Communication ?

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Not necessarily - but it changes where the time is spent, moving it away from the patient

TroeltzschBrothers
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Not necessarily - but it gives more control and insight information and thus reduces the mistake rate

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Yes definitely

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Not necessarily - high invest but longterm beneficial

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Depending on the surgeon but in general yes

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YES YES YES YES YES YES YES YES

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Absolutely yes !