

Two Immediate Temporization Methods Exemplified: Flap vs. Punch Technique in Implant Surgery





Provisional Restoration of Single Tooth Implants into Healed Ridges in the Esthetic Zone



The digital jCD version features a preview and link to an educational DentalXP video about this article.



After reading this article, the participant should be able to:

1. Understand some of the advantages of utilizing immediate non-occlusal loading of implants with temporary crowns when placed in healed ridges.
2. Recognize the differences in temporary crown fabrication techniques when implants are placed using a flap or flapless technique.
3. Understand the importance of subgingival emergence profiles of temporary crowns when a flap or flapless implant protocol is used.

Stephen J. Chu, DMD, MSD, CDT
Dennis P. Tarnow, DDS

Abstract

Protocols and techniques for immediate tooth replacement in the esthetic zone have become more popular and predictable within the past decade. Two different clinical scenarios are presented where immediate temporization of implants placed into healed or augmented ridges is exemplified. The benefits of augmentation prior to implant placement and temporization are that flap elevation is not required; therefore, the blood supply to the labial plate is not compromised, thereby eliminating potential midfacial recession. In addition, the soft tissue subgingival shape of the temporary crown can be non-surgically sculpted at the time of implant placement since the patient is already anesthetized.

Key Words: delayed implant placement, immediate temporization, transmucosal “punch” technique, flat subgingival contours, blood supply

Introduction

Many factors should be considered when placing implants into the esthetic zone, in order to determine which procedure is best to achieve the desired outcome. Current technologies, knowledge, and techniques may not only allow condensed healing time of implants to final delivery of the definitive restoration, but also a simultaneous immediate temporary crown. This can be of tremendous benefit to both patients and clinicians since chairside procedures can be condensed into fewer appointments, thereby decreasing overall treatment time without potential risk of implant failure.

Immediate post-extraction socket implants in the esthetic zone have gained popularity and success in regard to survival, osseointegration, and esthetic outcomes over the past decade,¹⁻¹¹ although this type of treatment requires a specific skill set of knowledge within the dental team to achieve a predictable outcome, especially in regard to optimal esthetics. Also, the philosophy of immediate treatment is quite diverse from delayed implant placement: one of “preservation” of existing hard and soft tissues versus “creation” of lost structures.

Delayed implants are frequently necessary since an intact or Type I socket¹² is not always present after tooth removal due to the prior damage to the periodontium from the diseased tooth. In these situations, it is often necessary to reconstruct the ridge at the time of tooth removal or after ridge healing. Salama and colleagues have stated that it is best to do all site development prior to implant placement to ensure a predictable result.¹³ In addition, patients undergoing time-consuming procedures such as orthodontic therapy to create the proper space adjacent to an edentulous site, treatment planned to receive an implant, are frequently anxious to receive a fixed temporary crown restoration in lieu of an existing denture tooth fastened to an orthodontic arch wire.

In 2011, den Hartog and colleagues reported survival rates of immediate non-occlusally loaded single implants in the esthetic zone. The results showed a 3% difference in survival rate, 97% versus 100%, respectively, if an immediate temporary restoration was placed rather than burying the implant as a two-stage implant procedure.¹⁴

However, questions still remain in regard to immediate temporization of implants placed into healed or augmented edentulous sites:

- What techniques and clinical procedures are best to offer a predictable result?
- When can implant placement be combined with site augmentation and simultaneous temporization?

“Delayed implants are frequently necessary since an intact or Type I socket is not always present after tooth removal due to the prior damage to the periodontium from the diseased tooth.”

- What will the esthetic outcome be?

Two case reports are presented here to address these questions as well as to exemplify immediate tooth replacement with a temporary screw-retained crown. The first addresses hard tissue augmentation combined with implant placement; the second presents techniques that can be used when augmentation has been performed prior and separate to implant placement and temporization.

Case Report 1

A 24-year-old female presented with a missing tooth #7. This tooth had a prior history of root canal therapy with a subsequent fracture of the coronal tooth structure (Fig 1). The tooth was deemed non-restorable and was subsequently extracted and a transitional removable partial prosthesis (RPP) delivered. After six months of healing of the edentulous site, an implant was treatment planned to replace #7 (Fig 2). Since the existing interproximal papillae were intact, a papilla-sparing incision design was employed.¹⁵ The clinical surgical challenge would be to increase the facial-palatal dimension of the edentulous site because collapse had occurred after tooth removal (Fig 3). A 3.25-mm diameter implant (Certain, Biomet 3i; Palm Beach, FL) was placed securely in bone with a minimum torque value of 35 to 40 Ncm to allow immediate temporization of the implant (Fig 4). Implant placement toward the palatal aspect of the ridge was critical to allow fabrication of a screw-retained temporary crown, thereby eliminating the risk of cement retention and flap irritation.¹⁶ A provisional screw-retained implant cylinder (PreFormance Temporary Cylinder, Biomet 3i) was placed and an acrylic tooth was relined onto the post part of the abutment (Figs 5 & 6). Autopolymerizing acrylic resin (Super-T, American Conglomerated; Solon, OH) was added to the temporary crown to fill in the deficient areas; flat subgingival contours were created to allow proper flap adaptation (Fig 7).¹⁷ A bone allograft (Puros, Zimmer Dental; Carlsbad, CA) and resorbable membrane (BioMendExtend, Zimmer Dental) were placed to increase the width of the facial ridge and the flap was sutured around the temporary crown restoration (Figs 8-10). Normal healing of the surgical area was noted two weeks post-treatment (Fig 11). The implant and bone graft were allowed to heal for five months before impression-making and final restoration. The ridge width was increased to allow predictable restoration of the edentulous site as well as esthetic integration of the porcelain-fused-to-metal restoration (Figs 12-14).



Figure 1: Preoperative radiograph of root canal-treated tooth #7, which eventually fractured.



Figure 2: After six months' post-extraction healing of the ridge, an implant was treatment planned for placement.



Figure 3: A papilla-sparing incision design was used with full flap elevation to expose the labial bone plate.



Figure 4: The narrow width of the edentulous ridge was visualized and a 3.25-mm diameter implant was placed completely within the bony housing.

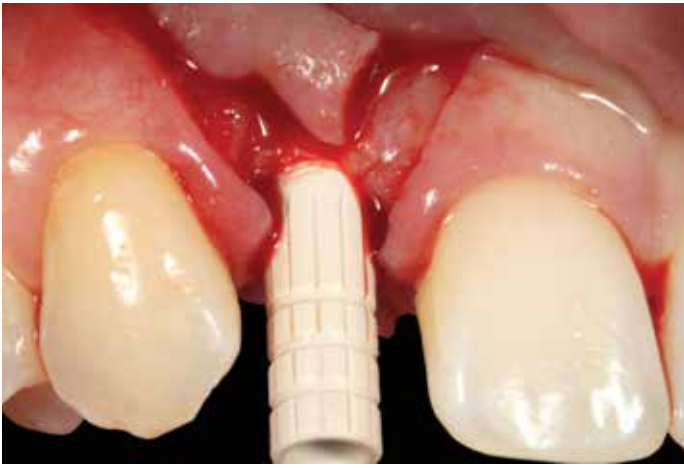


Figure 5: The construction of the temporary crown was made prior to grafting of the collapsed ridge. A screw-retained straight temporary cylinder was seated.



Figure 6: An acrylic crown facing was relined with autopolymerizing acrylic onto the implant temporary cylinder.



Figure 7: The final temporary crown was constructed using the Nealon liquid-powder technique. Flat subgingival crown contours were created to allow proper flap adaptation with primary closure.



Figure 8: A bone allograft was placed to augment the collapsed labial aspect of the edentulous ridge in combination with implant placement and temporization.



Figure 9: A resorbable membrane was placed over the bone allograft material for guided regeneration.



Figure 10: Proper subgingival contouring of the provisional restoration allowed primary flap closure. The temporary crown was relieved in maximum intercuspal position and lateral excursions.



Figure 11: Two weeks' postoperative healing of #7.

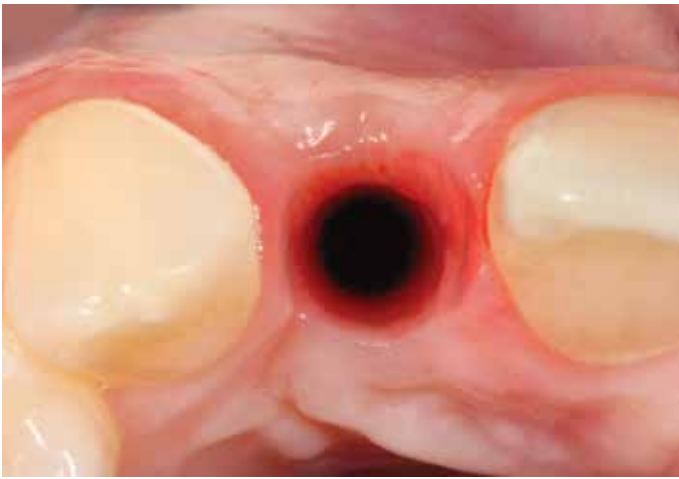


Figure 12: The temporary crown was disconnected after five months' post-healing. Note the fullness of the labial ridge after augmentation.



Figure 13: The definitive screw-retained porcelain-fused-to-gold crown inserted. Esthetic and functional integration was achieved.



Figure 14: Post-treatment radiograph of implant #7.

Case Report 2

This case report exemplifies a difference between the prior clinical example where the ridge was reconstructed simultaneously with the placement of an implant and temporary restoration. In this clinical scenario, the ridge was developed prior to implant placement and temporization.

A 45-year-old female patient presented with a retained upper right primary canine tooth (UR-c) with a horizontally impacted permanent cuspid (Figs 15-17). The primary and permanent canine teeth were extracted, the site was reconstructed with bone allograft material (Puros), and a transitional "flipper" RPP fabricated. After six months' healing, the ridge was completely healed and reconstituted in terms of size, shape, and bone volume (Figs 18-20). A transmucosal "punch" technique was used to remove the soft tissue to the crest of bone, thereby allowing the implant to be placed employing a "flapless" technique (Figs 21-26). The trade-off in this technique is that implant placement surgery is more demanding since it is essentially performed "blind" through a 5-mm diameter opening (Fig 24). Again, a straight screw-retained temporary abutment was placed onto the implant (Fig 27) and an acrylic tooth was relined onto the surface. Using the Nealon technique¹⁸ (i.e., liquid-powder paintbrush technique), acrylic was added to the undercontoured areas of the temporary crown to create the proper final contour (Fig 28). The benefit of this flapless or punch surgical technique allows the soft tissues to be molded and stretched¹⁹ at the time of implant placement since there are no vertical releasing incisions to negotiate flap adaptation and suturing. And most importantly, the blood supply to the labial aspect of the edentulous ridge is neither compromised nor interrupted since flap elevation is absent with this technique. The periosteum is the only other source of blood supply to the labial plate besides the endosteum (marrow); therefore, with full flap elevation this source is no longer present. The occlusion on the temporary crown was relieved in both maximum intercuspal position (MIP) and lateral excursive movements (Fig 29). After a minimum healing time of three to four months, the temporary crown was disconnected (Fig 30) and an implant-level impression was made using autopolymerizing resin [Pattern Resin LS, GC America; Alsip, IL] to register the shape of the soft tissue profile (Fig 31). A definitive screw-retained porcelain-fused-to-gold alloy crown was fabricated (Fig 32) and inserted (Fig 33). The integration of form, function, and esthetics was achieved predictably with this technique of ridge reconstruction prior to implant placement with an immediate non-occlusally loaded temporary crown.



Figure 15: Clinical preoperative condition of retained primary tooth UR-c.



Figure 16: Periapical radiograph of preoperative condition of retained primary tooth UR-c with horizontal impaction of permanent #6.



Figure 17: CBCT radiograph of preoperative condition of retained primary tooth UR-c with horizontal impaction of permanent tooth #6.



Figure 18: Labial view of healed edentulous ridge #6 after extraction of primary tooth UR-c and impacted permanent #6.



Figure 19: Occlusal view of the reconstructed edentulous ridge #6 with ample labial-palatal width and volume of the hard and soft tissues.



Figure 20: Six months' post-healing periapical radiograph of #6 showing proper radiopacity for implant placement.



Figure 21: A 5-mm diameter transmucosal soft tissue punch was used to create a circumferential incision of the supracrestal soft tissue over the edentulous ridge site.

“The integration of form, function, and esthetics was achieved predictably with this technique of ridge reconstruction prior to implant placement with an immediate non-occlusally loaded temporary crown.”



Figure 22: The soft tissue is excised over the osseous ridge crest using a sharp excavator.



Figure 23: A periodontal probe was used to measure the amount of soft tissue thickness (4 mm) over the edentulous ridge bone crest.



Figure 24: A clean soft tissue incision was created with the punch and the access hole was slightly to the palatal aspect for "blind" implant placement.



Figure 25: The implant was placed through the punch.



Figure 26: The seating of the implant was verified with a periapical radiograph.



Figure 27: The screw-retained straight temporary cylinder was seated onto the implant to receive the temporary crown.



Figure 28: The liquid-powder paint on acrylic technique was used to add the proper final subgingival contour to the provisional implant crown. This would obviate the need to go back later and contour the tissue after implant healing.



Figure 29: The temporary crown was relieved in MIP and lateral excursive movements so it would be non-occlusally loaded.



Figure 30: After four months' post-surgical healing the provisional crown was disconnected. Notice the proper shape and profile of the peri-implant soft tissues, which were developed at the time of implant placement.



Figure 31: An implant-level impression transfer coping was placed onto the implant and pattern resin was used to register the soft tissue profile.



Figure 32: A definitive screw-retained porcelain-fused-to-gold crown was made for #6.



Figure 33: Esthetic and functional harmony of the implant restoration was achieved using the immediate temporization and transmucosal “punch” technique.

Summary

Immediate temporization can be performed with implants placed into post-extraction sockets (more commonly referred to as “immediate implants”).

Implants can also be placed into healed ridges and an immediate temporary can be made on these implants even though the traditional healing time for bone maturation has not occurred.

With the new macro thread designs of current implants, this can be accomplished, the clinical keys being that the insertion torque value of the implant is high (40+ Ncm) and the temporary is not in occlusion.

When managing esthetic challenges on anterior implants, many factors must be considered prior to treatment. One of the primary challenges facing restorative dentists and surgeons alike is when an immediate temporary crown can be placed onto an implant that has been placed into a post-extraction socket. Equally as relevant is one that has been placed into a healed edentulous site. Using prior experience and evidence-based studies, the authors have reviewed and offered two methods for treating this clinical situation. The transmucosal “punch” technique requires prior ridge augmentation/reconstruction and greater surgical skill in implant placement. However, this technique offers greater control in temporary restoration fabrication in terms of crown contour and potentially less recession of the midfacial tissues since a labial flap is neither elevated nor required. By employing these methods, patient issues can be resolved in shorter and more predictable treatment times with lasting biologic and esthetic results.

References

1. Wöhrle PS. Single-tooth replacement in the aesthetic zone with immediate provisionalization: fourteen consecutive case reports. *Pract Periodontics Aesthet Dent*. 1998 Nov-Dec;10(9):1107-14; quiz 1116.
2. Kan JY, Rungcharassaeng K, Lozada J. Immediate placement and provisionalization of maxillary anterior single implants: 1-year prospective study. *Int J Oral Maxillofac Implants*. 2003 Jan-Feb;18(1):31-9.
3. Cooper LE, Raes F, Reside GJ, Garriga JS, Tarrida LG, Wiltfang J, Kern M, de Bruyn H. Comparison of radiographic and clinical outcomes following immediate provisionalization of single-tooth dental implants placed in healed alveolar ridges and extraction sockets. *Int J Oral Maxillofac Implants*. 2010 Nov-Dec;25(6):1222-32.
4. Tortamano P, Camargo LO, Bello-Silva MS, Kanashiro LH. Immediate implant placement and restoration in the esthetic zone: a prospective study with 18 months of follow-up. *Int J Oral Maxillofac Implants*. 2010 Mar-Apr;25(2):345-50.
5. Block MS, Mercante DE, Lirette D, Mohamed W, Ryser M, Castellon P. Prospective evaluation of immediate and delayed provisional single tooth restorations. *J Oral Maxillofac Surg*. 2009 Nov;67(11 Suppl):89-107.
6. De Rouck T, Collys K, Wyn I, Cosyn J. Instant provisionalization of immediate single-tooth implants is essential to optimize esthetic treatment outcome. *Clin Oral Implants Res*. 2009 Jun;20(6):566-70.
7. Grunder U. Crestal ridge width changes when placing implants at the time of tooth extraction with and without soft tissue augmentation after a healing period of 6 months: report of 24 consecutive cases. *Int J Periodontics Restorative Dent*. 2011 Feb;31(1):9-17.
8. Chu SJ, Salama MA, Salama H, Garber DA, Saito H, Sarnachiaro GO, Tarnow DP. The dual-zone therapeutic concept of managing immediate implant placement and provisional restoration in anterior extraction sockets. *Compend Contin Educ Dent*. 2012 Jul-Aug;33(7):524-32.
9. Araujo MG, Lindhe J. Dimensional ridge alterations following tooth extraction. An experimental study in the dog. *J Clin Periodontol*. 2005 Feb;32(2):212-8.
10. Caneva M, Salata LA, de Souza SS, Baffone G, Lang NP, Botticelli D. Influence of implant positioning in extraction sockets on osseointegration: histomorphometric analyses in dogs. *Clin Oral Implants Res*. 2010 Jan;21(1):43-9.
11. Caneva M, Salata LA, de Souza SS, Bressan E, Botticelli D, Lang NP. Hard tissue formation adjacent to implants of various size and configuration immediately placed into extraction sockets: an experimental study in dogs. *Clin Oral Implants Res*. 2010 Sep;21(9):885-90.
12. Elian N, Cho SC, Smith RB, Froum S, Tarnow DP. A simplified socket classification and repair technique. *Pract Proced Aesthet Dent*. 2007 Mar;19(2):99-104.
13. Salama H, Salama MA, Li Te-Fu, Garber DA, Adar P. Treatment planning 2000: an esthetically oriented revision of the original implant protocol. *J Esthet Dent*. 1997;9(2):55-67.
14. den Hartog L, Raghoebar GM, Stellingsma K, Vissink A, Meijer HJ. Immediate non-occlusal loading of single implants in the aesthetic zone: a randomized clinical trial. *J Clin Periodontol*. 2011 Feb;38(2):186-94.
15. Gomez-Roman G. Influence of flap design on peri-implant interproximal crestal bone loss around single-tooth implants. *Int J Oral Maxillofac Implants*. 2001 Jan-Feb;16(1):61-7.
16. Wilson TG Jr. The positive relationship between excess cement and peri-implant disease: *J Periodontol*. 2009 Sep;80(9):1388-92.
17. Weisgold AS. Contours of the full crown restoration. *Alpha Omegan*. 1977 Dec;70(3):77-89.
18. Nealon FH. Acrylic restorations by the operative non-pressure procedure. *J Prosthet Dent*. 1952 Jul;2(4):513-27.
19. Zamzok J. Avoiding ridge laps through nonsurgical soft tissue sculpting on implant restorations. *J Esthet Dent*. 1996;8(5):222-8. **JCD**

“By employing these methods, patient issues can be resolved in shorter and more predictable treatment times with lasting biologic and esthetic results.”



Dr. Chu is an associate clinical professor in the Department of Prosthodontics and the director of Aesthetic Education at the Columbia University College of Dental Medicine. He maintains a private practice in New York City. He can be reached at info@SDNYonline.com



Dr. Tarnow is a clinical professor of periodontology and director of Implant Education at Columbia University School of Dental Medicine. He maintains a private practice in New York City. He can be reached at info@SDNYonline.com

Disclosures: The authors did not report any disclosures.

AACD Self-Instruction Continuing Education Information



General Information

This continuing education (CE) self-instruction program has been developed by the American Academy of Cosmetic Dentistry (AACD) and an advisory committee of the *Journal of Cosmetic Dentistry*.

Eligibility and Cost

The exam is free of charge and is intended for and available to AACD members only. It is the responsibility of each participant to contact his or her state board for its requirements regarding acceptance of CE credits. The AACD designates this activity for 3 continuing education credits.

Testing and CE

The self-instruction exam comprises 10 multiple-choice questions. To receive course credit, AACD members must complete and submit the exam and answer at least 70% of the questions correctly. Participants will receive tests results immediately after taking the examination online and can only take each exam once. The exam is scored automatically by the AACD's online testing component. The deadline for completed exams is one calendar year from the publication date of the issue in which the exam appeared. The exam is available online at www.aacd.com. A current web browser is necessary to complete the exam; no special software is needed.

Note: Although the AACD grants these CE credits, it is up to the receiving governing body to determine the amount of CE credits they will accept and grant to participants.

Verification of Participation (VOP)

VOP will be sent to AACD members via their MyAACD account upon pass completion. Log onto www.aacd.com to sign into your MyAACD account.

For members of the Academy of General Dentistry (AGD): The AACD will send the AGD proof of your credits earned on a monthly basis. To do this, AACD must have your AGD member number on file. Be sure to update your AGD member number in your AACD member profile on MyAACD.com.

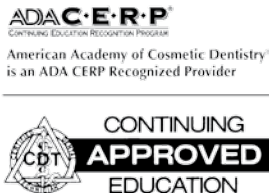
All participants are responsible for sending proof of earned CE credits to their state dental board or agency for licensure purposes.

Disclaimer

AACD's self-instruction exams may not provide enough comprehensive information for participants to implement into practice. It is recommended that participants seek additional information as required. The AACD Self-Instruction Program adheres to the guidelines set forth by the American Dental Association Continuing Education Recognition Program (CERP), and the AGD Program Approval for Continuing Education (PACE).

Questions and Feedback

For questions regarding a specific course, information regarding your CE credits, or to give feedback on a CE self-instruction exam, please contact the AACD Executive Office by e-mailing meetings@aacd.com or by calling 800.543.9220 or 608.222.8583.



ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry. AACD designates this activity for 3 continuing education credits. Concerns or complaints about a CE provider may be directed to the provider or to ADA CERP at www.ada.org/goto/cerp.

The 10 multiple-choice questions for this Continuing Education (CE) self-instruction exam are based on the article, "Two Immediate Temporization Methods Exemplified: Flap vs. Punch Technique in Implant Surgery," by Stephen Chu, DMD, MSD, CDT; and Dennis Tarnow, DDS. This article appears on pages 118-129.

The examination is free of charge and available to AACD members only. AACD members must log onto www.aacd.com to take the exam. **Note: Only Questions 1 through 5 appear in the printed and digital versions of the jCD; they are for readers' information only.** The complete, official self-instruction exam is available online only—completed exams submitted any other way will not be accepted or processed. A current web browser is necessary to complete the exam; no special software is needed. The AACD is a recognized credit provider for the Academy of General Dentistry, American Dental Association, and National Association of Dental Laboratories. For any questions regarding this self-instruction exam, call the AACD at 800.543.9220 or 608.222.8583.

1. To reconstruct the ridge for optimal implant placement, it is best to do which of the following?
 - a. Place an implant at the time of tooth extraction.
 - b. Reconstruct the ridge at the time of implant placement.
 - c. Do all site development prior to implant placement.
 - d. Place a bone graft at the time of implant placement.
2. Comparing the success rate between placing an immediate temporary implant restoration or burying the implant as a two-stage implant procedure, the study by den Hartog and colleagues showed that
 - a. there is a minimal (3 to 5%) difference in the success rate between the two procedures.
 - b. there is approximately a 25% improvement in the success rate when using a two-stage implant procedure.
 - c. there is approximately a 25% improvement in the success rate when an immediate temporary is used.
 - d. there is a minimal (3 to 5%) improvement when an immediate temporary is used.
3. Which of the following is a benefit of using a screw-retained temporary crown?
 - a. The implant can be placed more buccally in the extraction site.
 - b. The implant can be placed more palatally in the extraction site.
 - c. The risk of a screw loosening on the temporary crown is eliminated.
 - d. The risk of cement retention below the flap is eliminated.
4. Which of the following is a disadvantage of using a "flapless" technique during implant placement surgery?
 - a. There is more bleeding, therefore the surgical site is harder to see.
 - b. The surgery is more demanding due to the limited view of the surgical site without a flap.
 - c. An immediate temporary cannot be used with this technique.
 - d. An immediate temporary must be used with this technique.
5. What is the main advantage, from the surgical perspective, of using a flapless technique during implant placement surgery?
 - a. The surgery is easier and faster.
 - b. The soft tissues can be molded and stretched.
 - c. The surgery is less painful for the patient.
 - d. The blood supply to the edentulous ridge is not compromised.

To see and take the complete exam, log onto www.aacd.com.