A horizontal incision is made on the ridge crest. Full-thickness buccal and lingual flaps are elevated. Non-submerged implants are placed, and healing caps are connected following a standardized technique. The E-C and CT portions of the graft are determined; the graft is rectangular in shape in the frontal view and wedge-shaped in the cross-sectional view. The E-C portion is tied around the healing caps using sling sutures. The graft is then closely connected to the lingual flap by using an interrupted suture to obtain primary closure in the interproximal area. Consequently, the buccal flap is positioned apically and fixed at the inferior border level of the E-C portion. These kinds of grafts achieve buccolingual and apicocoronal ridge augmentations. This procedure encounters minimal postoperative shrinkage of the grafted gingiva, deepening of the buccal vestibule, rapid revascularization of the grafted gingiva, shortening of the healing time, and prevention of graft shrinkage. This technique reconstructs an interdental papilla by elevating a facial envelope type of split-thickness flap followed by the harvesting of a suitable connective tissue graft from the tuberosity area and its placement under the flap in the interdental papilla area [Figure 4] a and [Figure 4] b. Furthermore, the periimplant mucosa was significantly thicker and more coronally positioned. When a thinner tissue graft was used the tenets of soft tissue grafting with SCTG essentially remain the same as with soft tissue augmentation procedures around natural teeth. The recipient site must provide for rigid immobilization of the graft tissue. Adequate hemostasis must be obtained at the recipient site. The donor tissue must be large enough to facilitate immobilization and result in the desired volume augmentation after secondary contraction has occurred. Vascularized Interpositional Periosteal Connective Tissue Flap [43] This technique is preferred for large volume soft tissue augmentation and for simultaneous hard and soft tissue graftings. The procedure involves raising a subepithelial palatal connective tissue periosteal flap and rotating it into the prepared anterior recipient site. It is then positioned beneath the curvilinear recipient flap and rigidly immobilized with sutures. During initial healing, a customized tooth-borne provisional restoration is recommended. An appropriate decision to augment either the soft tissue alone or hard tissue alone or a combination of both has to be decided. The three most common intraoral donor sites for harvesting connective tissue grafts are the tuberosity, the single incision-deep palatal, and the FGG method-superficial palatal. Depending on the availability and the need, the donor area is opted. The quality of tissue from the tuberosity is generally denser but the quantity is limited. The initial incision may be slightly palatal rather than midcrestal to retain the KG. The incision is extended as sulcular incisions onto the adjacent teeth or as papillae sparing vertical releasing incisions passing to the level of the MGJ. A full-thickness flap is raised to allow access for surgical placement of the implant s. The recipient bed should be kept well-hydrated. A partial-thickness flap is now reflected at the recipient area beyond the MGJ, leaving a layer of approximately mm of connective tissue and periosteum intact. After placement of the implant, the harvested graft is adapted to the area. The graft should be adequate to provide soft tissue bulk at the level of the neck of the implant. This facilitates an aesthetic emergence profile. The tissue graft should be trimmed to resemble a semicircular cone and the apical aspect of the graft should not cover the proximal surfaces of adjacent teeth. Excessive bulk will hamper the aesthetic effect. The graft should be secured in the recipient bed utilizing a locking suture. The suture needle initially penetrates the palatal KT in a palatobuccal direction. The needle then passes through the mesial aspect of the graft employing a faciopalatalal direction. The sequence is repeated for the distal portion of the graft and as the needle exits the palatal flap a second time, a knot is placed on the palatal side. The apex of the graft is stabilized in the connective tissue at the base of the flap so that the graft is stretched and well-adapted onto the recipient bed. The ideal suturing principles should be followed to enhance plasmatic circulation. The graft is
then covered with the coronally advanced mucosal flap. It should be attempted to advance and secure the mucosal margin at least 2 mm coronally. In certain clinical situations, free connective tissue grafts are placed concomitantly in implants placed immediately into extraction sockets. Implants thus placed showed better bone levels, KT width, and patient satisfaction as compared with sites that received no CTG. Moreover, the use of connective tissue grafts has been proposed to compensate for ridge resorption that occurs after tooth extraction and immediate implant installation and thus, to improve the aesthetic outcomes. The soft tissue aesthetic outcome plays a vital role in achieving clinical aesthetic success. Connective tissue graft might be necessary in about one-third of the patients following immediate implant placement after tooth extraction to achieve steady improvement in PES score. CTGs demonstrate better results in terms of aesthetics and color matching. To compensate for these inadequacies, soft tissue substitutes have been used. Among these dermal allografts, such as the acellular dermal matrix graft [55] and human fibroblast-derived dermal substitute have been used for the palatal donor tissue. Allograft materials resulted in increase in width of KT. Mucograft, [58] a collagen matrix of porcine origin successfully increased the width of KG and also improved the aesthetic outcomes but decreased postoperative morbidity comparable with autogenous CTGs. The mechanism of action is by acting as a scaffold that allows the ingrowth and repopulation of fibroblasts, blood vessels, and the epithelium from surrounding tissues, eventually being transformed into KT. Its use in large mucosal defects has also reported good clinical outcomes. Modifications of Soft Tissue Augmentation Techniques A modification of the roll technique Abrams can be performed at the time of the second surgical procedure. The mobile pedicle connective tissue flap is buccally rotated to increase soft tissue thickness. A subsequent modification of this technique that avoided buccal releasing incisions is used an intrasulcular incision on the adjacent teeth to improve the aesthetic outcomes. This modified design also resulted in quick healing of the palatal donor site [ Figure 5].
Compared to the free autograft, the pedicled flap is much more predictable and has a much better chance of survival over poorly vascularized areas such as the bone graft or nonresorbable membrane.

Lorenzana, DDS, MS Abstract Thorough diagnosis of the esthetic requirements and ramifications of restorative and implant dentistry in the esthetic zone requires a standardized, methodical approach. Examination of the periodontal and peri-implant tissues is an essential component of this approach because overall gingival display, soft-tissue position and volume, and papilla quantity and quality can exert significant influence on overall implant position as well as the overall esthetic outcome. Clinical evaluation of risk in esthetic implant dentistry has been the subject of much discussion in the literature as the prevalence of implant-based reconstruction in the esthetic zone has risen. In other words, any assessment of risk involving implant dentistry can begin with the unit to be replaced, but it certainly cannot end there. Certainly one of the many challenges in any practice setting is the development of a systematic process for the documentation of clinical information critical to the formulation of a comprehensive esthetic treatment plan. For those clinicians unfamiliar with overall esthetic analysis and available soft-tissue enhancement techniques, this process can seem overwhelming. Surgical and prosthetic reconstruction in the esthetic zone is a process that requires close interaction between restorative and surgical professionals. Because most periodontal plastic surgery and dental implant patients originate with their restorative dentist, it is important that the restorative dentist be well versed on key esthetic variables and available surgical techniques to better prepare the patient for the surgical consultation. Such preparation cannot be underestimated, and the enhanced communication gives the patient further confidence in the restorativeâ€™surgical team. This article presents a clinical risk assessment report, entitled the Smile Analysis, Gingival Esthetics, and Dental Implant Report Figure 2, which serves as a diagnostic template or form that improves communication within the periodontalâ€™restorative team. This report aims to assist any clinician seeking a greater awareness of smile analysis and gingival esthetics and how they complement conventional restorative and esthetic implant-based reconstructions. Its purpose is to incorporate an overall esthetic analysis14,15 and comprehensive assessment of common soft-tissue deficiencies16 with dental implant treatment planning. This serves to highlight the importance and impact of a thorough esthetic and soft-tissue analysis on dental implant therapy. The last point is of particular importance because the health, position, contour, form, quantity, quality, and color of the gingiva, central to the practice of periodontics, is also critical to the practice of implant dentistry, particularly in the esthetic zone. Finally, the question of time constraints can be an important factor when discussing treatment options and can help temper unreasonable expectations of treatment propagated by popular media. Deviations from the norm in how these reference lines relate to one another are the first step in diagnosing functional and esthetic discrepancies. The interpupillary line is generally accepted as the key horizontal plane of reference, but care should be taken in the establishment of the horizontal plane of reference because the interpupillary line is not always parallel to the horizon line Figure 3. What exactly constitutes "esthetic" has been shown to be in the eye of the beholder19,23 and subject to outside influence, particularly from the popular media. It is also important to note that the dental office is not an environment most naturally suited to the analysis of the smile in the sense that a dental examination is seldom a relaxing experience for most patients. Therefore, an effort must be made to keep the atmosphere informal and friendly, so the patient feels comfortable and able to smile more freely, engaging all of the facial muscles involved in the act of smiling. A significant amount of information useful to an esthetic analysis can be gleaned during informal conversation when patients have let down their guard and are least aware that observations about their facial and perioral structures are being made. Incisal edge display with the lips at rest has been reported to range from 1 mm to 5 mm, with a normal range considered to be 2 mm to 4 mm for women and 1 mm to 3 mm for men. Several authors also have reported that these numbers generally decrease with advancing age, primarily caused by loss of muscle tone and incisal wear Figure 7.
Most authors concur that gingival display in excess of 3 mm to 4 mm is considered unesthetic. Next, the length of the upper lip, measured from the base of the nose to the inferior border of the upper lip, is recorded, with average measurements between 20 mm and 22 mm in women and 22 mm and 24 mm in men. Finally, biotype determination is made by noting whether the patient displays a thick or thin biotype and whether the contour is flat or scalloped. Biotype is defined as a variation in tissue morphology because of tooth form.

Gingival Esthetics The portion of the report devoted to gingival esthetics focuses on the most common periodontal plastic surgery procedures likely to impact restorative outcomes: Each section guides the clinician in obtaining the relevant clinical information necessary for interdisciplinary communication and execution, thereby minimizing esthetic risk and ensuring a successful outcome. Crown Lengthening Crown lengthening procedures traditionally have been applied in situations requiring additional tooth structure for restorative procedures, such as subgingival caries and fractures. The classic crown lengthening procedure involves gingivectomy and osseous recontouring to re-establish the biologic width at a more apical position.

Soft-Tissue Grafts This section documents the locations where grafting is required and the relevant clinical information ie, amount of recession, keratinized gingiva, total attachment loss, as well as the expected root coverage, and if a restoration is planned. The position of the roots, interproximal bone height, location of contact points, volume of soft tissue, and need for orthodontics is recorded. Figure 19, Figure 20 and Figure 21 show an interdisciplinary case where a previous periodontal abscess and malpositioned teeth had resulted in a deficiency of the interdental papilla between teeth Nos. After consultation with an orthodontist, the interdental area was grafted in a manner described by Azzi and colleagues, using autogenous connective tissue. Four weeks after the procedure, orthodontic treatment was begun to rotate and align the anterior teeth. Along with periodic adjustments, interdental stripping was performed to broaden the contact points and minimize the interdental spaces. Figure 22 shows the anterior teeth 2 years after tissue grafting and orthodontic treatment. Because loss of a tooth in the esthetic zone has the potential to be psychologically traumatic for a patient, coordination between the surgeon and restorative dentist to address not only the functional aspect of the planned treatment, but also the esthetic and psychological aspects, is paramount. The priority among these aspects is the manner in which the edentulous area will be provisionalized—removable partial denture, fixed partial denture, or implant-supported restoration. After the type of provisional is determined, the pontic design is determined and noted on the report as well as the need for future reshaping and timing of the definitive restoration. Myriad techniques have been reported in the literature for ridge preservation and ridge augmentation, as well as the use of ovate pontics in conventional restorative and implant-supported reconstructions. Dental Implants Documentation of clinical data relevant to the edentulous sites begins with noting the type of implant-supported restoration planned and a basic visual site evaluation. More definitive site evaluation needs to follow to confirm the clinical findings, including the use of study casts, diagnostic wax-ups, templates, and advanced radiography such as tomograms or computed tomography scans. Case Report A year-old woman with a noncontributory medical history was referred for implant-supported replacement of a resin-retained fixed partial denture spanning teeth Nos. The findings of the smile analysis, gingival esthetics, and dental implant sections of the report are shown in Figure Initial facial analysis revealed her interpupillary line was generally parallel to her lip and incisal lines, but a 1. Her facial thirds were judged to be proportional. Smile analysis revealed 4 mm of incisal display with the lips at rest and 0 mm of gingival display but papilla exposure during full smile. Upper lip length was 20 mm and her lip line was judged to be medium Figure Her occlusal plane was judged to be generally parallel to the interpupillary line, with a reversed relationship to the lower lip at teeth Nos. The patient attributed this to intrusion of tooth No. In the full retracted anterior view Figure 25, aside from the planned replacement of tooth No. Among these, a discrepancy was noted in the tissue heights on teeth Nos. The proposed remedy was crown lengthening of tooth No. A related observation was the papilla deficiency between teeth Nos. Additional findings included marginal tissue recession on tooth No. The information gathered during the examination was used to formulate the treatment plan, including implant placement and ridge augmentation at site No.
Additional restorative procedures included provisionalization of tooth No. Figure 27, Figure 28 and Figure 29 show the final results. Discussion There are certain general esthetic objectives that are universal: The use of the report detailed herein is but one way to try to help clinicians accomplish that goal in a more organized and deliberate fashion. By presenting this report, it is hoped that it will be a relevant starting point for those seeking such a resource. The reconciliation of esthetic and gingival analyses with dental implant treatment is one of the most important aspects contained herein, because this is a rapidly developing focus of research and clinical practice, and because patients are more educated than ever before about dental treatment and are more demanding in their expectations. When confronted with the loss of a tooth or teeth within the esthetic zone, they seek the replacement of that unit in the most natural way possible. Predictable single tooth peri-implant esthetics: Compend Contin Educ Dent. Optimizing esthetics for implant restorations in the anterior maxilla: Int J Oral Maxillofac Implants. Pre-operative analysis and prosthetic treatment planning in esthetic implant dentistry. Implant Therapy in the Esthetic Zone: Implant-supported restorations in the anterior region: Pract Periodontics Aesthet Dent. Aesthetic implant restorations in partially edentulous patients—a critical appraisal. Physiologic dimensions of the periodontium significant to the restorative dentist. Regenerative and reconstructive periodontal plastic surgery. Dent Clin North Am. The development of periodontal plastic surgery. Israelson H, Plemons JM. Dental implants, regenerative techniques, and periodontal plastic surgery to restore maxillary anterior esthetics. Reading a smiling face: Can a new smile make you look more intelligent and successful? Esthetic Rehabilitation in Fixed Prosthodontics. A Systematic Approach to Prosthetic Treatment. Chiche GJ, Pinault A. Artistic and scientific principles applied to esthetic dentistry. Chiche GJ, Pinault A, eds. Esthetics of Anterior Fixed Prosthodontics. The impact of the popular media on cosmetic dentistry. N Z Dent J. The influence of plastic surgery "reality TV" on cosmetic surgery patient expectations and decision making. Comparing the perception of dentists and lay people to altered dental esthetics. Moskowitz M, Nayyar A. Determinants of dental esthetics: Geometric considerations in anterior dental aesthetics: Impact of dental asymmetries on the perception of smile esthetics. Am J Orthod Dentofacial Orthop. Geron S, Atalia W. Influence of sex on the perception of oral and smile esthetics with different gingival display and incisal plane inclination.
As a result, the clinical applications of osseointegration have gradually been expanded to include the treatment of edentulous maxillary arches, various degrees of alveolar atrophy, and partial edentulism. Although the immobility of the bone-implant interface was initially credited as the breakthrough for overcoming the biologic soft tissue problems that plagued predecessor implants anchored via fibrous encapsulation, the mechanism by which a stable soft tissue environment developed around the osseointegrated implant was far from understood. Furthermore, the detrimental effect of mobility of peri-implant soft tissues on the long-term prognosis of an osseointegrated implant was either ignored or greatly underestimated. As information concerning the anatomic similarities and important differences between periodontal soft tissues and peri-implant soft tissues became available, the profession made great strides in understanding the biologic processes involved in the formation and maturation of the structural relationship between the soft tissues and an emerging implant. Through experience, clinicians were also gaining a greater appreciation for the importance of establishing a stable peri-implant soft tissue environment. In particular, when osseointegrated implants were first used for esthetic tooth replacements, the lack of predictability and the unacceptable rate of compromised outcomes underscored the importance of proper surgical and prosthetic soft tissue management.

Although there was an evident lack of consensus in the implant literature regarding the need for attached tissues around implant restorations, experienced clinicians correlated the presence of attached nonmobile tissues with a decrease in soft tissue-related complications, facilitation of prosthetic procedures for the restorative dentist, and greater satisfaction by their patients. Despite these developments, the need for practical guidelines and detailed information concerning the surgical management of peri-implant soft tissues in individual case situations and patient types has largely gone unanswered. This book was written to fill that void. It combines original concepts and techniques with information extrapolated from the specialties of oral and maxillofacial surgery, plastic and reconstructive surgery, and periodontology. Although the majority of the material covered is clinical in nature, the scientific basis and pertinent surgical anatomy for the successful use of the techniques and treatment protocols are introduced early on and reinforced throughout wherever applicable. The reader is led through a systematic evaluation of the esthetic implant patient, including consideration of the various conditions and anatomic limitations that adversely affect or limit treatment outcomes. From there, a new classification system for alveolar ridge defects specific to esthetic implant therapy is presented; each of these defects is subsequently correlated with appropriate treatment options later in the book. Surgical instrumentation, criteria for optimal flap designs, general soft tissue management considerations, guidelines for the use of surgical maneuvers, and surgical techniques for management of peri-implant soft tissues in specific case types are all presented in detail. In addition, the rationale and indications for use of periodontal soft tissue grafting techniques are provided, with details of surgical technique as well as guidelines for peri-operative patient care. Two innovative techniques are presented in separate sections. The impetus for the development of the Bio-Col alveolar ridge preservation technique is explained, along with expanded clinical applications and long-term clinical results. The vascularized periosteal-connective tissue flap VIP-CT flap, which enables predictable hard and soft tissue site development of anterior maxillary implant sites, also is presented, including the rationale, anatomic considerations, and a summary of my clinical experience in using it. Following a philosophy of care for the esthetic implant patient, hard and soft tissue implant site-development techniques are presented in correlation with the classification system for alveolar ridge defects introduced earlier. Prosthetic and surgical considerations for enhancing
outcomes in esthetic implant therapy, such as the use of custom healing abutments, laser soft tissue sculpting and resurfacing, and platelet-rich plasma, are then described. Finally, a conceptual framework for esthetic implant site development is presented to give the implant surgeon an understanding of the sequence and timing of procedures. The treatment algorithms included in the Appendix help the reader navigate the challenges of treatment planning esthetic implant therapy in an abbreviated and easy to follow format. The many clinical cases presented throughout the book demonstrate surgical detail in specific scenarios and can be used as a reference for the implant surgeon treating cases with similar history, anatomic presentation, and patient types. It is my sincere hope that the information in this book will help clinicians master new esthetic techniques that will ultimately benefit their patients.
Chapter 4 : Soft Tissue and Esthetic Considerations in Implant Therapy

In esthetic implant therapy, such as the use of custom healing abutments, laser soft tissue sculpting and resurfacing, and platelet-rich plasma, are then described. Finally, a conceptual.

I have completed watching the part 2. Kindly let me understand from which region did you harvest the autogenous bone for 2nd time grafting over the buccal aspect mixed with allogenous bone graft? Yip; The Bone graft material you speak of is not available in the US and I have no experience with it. As for Cytoplast, yes it is also a good membrane material and resorbs if exposed. Good luck and thanks for the post Dr. Salama, Thank you very much for the excellent video. Yes, my experience with GBR using Biooss is similar in that it is soft. Recently I tried Xenograft of equine source from Technoss Italy. There seems to be better primary stability but that is just a clinical experience with no scientific basis. Do you have any experience with that to share and would appreciate your comment on the use of cytoplast membrane for such a case since the latter material appeared uncomplicated despite being exposed or not covered. Better in terms of faster healing and denser bone regeneration. But No, higher morbidity for patient and higher risk of wound dehiscence. I believe very much in CTG with bone regeneration in these esthetic zone cases. Even with bone graft, membrane and PRGF. It thickens the soft tissue and provides for excellent long term gingival stability. As for block graft vs. Salama,s use of PRGF. The BTI co in Spain will not supply me with the protocol or equipment due to import concerns. I am willing to pay any costs to obtain the full step by step protocols and equipment necessary to follow Dr. I would very much appreciate any advise and help. Thank you for some great learning videos. Salama, for such a case i am using Legacy3 3. There is no Taper for the 3. It is a straight wall product. What small diameter 2 piece implants are you utilizing for small space areas? Salama Related Videos Dr. Maurice Salama describes the step-by-step surgical techniques required to ensure successful Guided bone as well as soft tissue enhancement of a deficient extraction site.