Zeroing in on Zero Complications (ZIOZ): Decreasing Adverse Events in Dental Implantology

Implant dentists have enjoyed high success rates regarding implant survival. The survival rate for implants before loading is 97-98%. The 5-yr post-loading survival rate is 94-95% and the long-term 16-yr survival rate is 82.9%. These survival rates are remarkable, but they are not without complications. Over the 16 years of survival, the biological complication rate is 16.94% and the technical complications rate is 31.09%, for a cumulative complication rate of 48.03%.(1) Survival is defined as the implant and prosthesis being present, independent of existing biological and/or technical complications at the time of observation. However, success is defined as the implant(s) being free of any complications over the entire observation time. (2, 3) Therefore, achieving success is more challenging than survival. The 48% cumulative complication rate can become a daily annoyance for the full-time implantologist who has been placing implants for multiple years. Often the complications can be solved, but not without patient discomfort, schedule disruptions, or financial expense. Managing a complication may result in a learning experience, but rarely is it financially rewarding. Thus, it would benefit the profession to zero in on zero complications.

In orthopedics, Snyder et al. in 2020 proactively addressed the complications experienced with orthopedic lower limb implants by developing a novel, evidence based, multimodal problem-prevention program referred to as "Zero in on Zero" (ZIOZ) Program. ZIOZ implements integrated clinical pathways (ICP) to achieve a synergistic preventive protocol as opposed to addressing each potential complication individually as they arise.(4) ICPs include multidisciplinary care plans that detail the essential steps in providing care for patients for a specific clinical problem or ones that occur over the entire episode of treatment. ZIOZ integrates treatments by all caregivers and prevention of complications in one evidence-based treatment program.

Orthopedics found that with an increased number of implants being placed there was a concomitant increase in the number of adverse events (AEs) that occurred. AEs for orthopedics included: (i) surgical site infections, (ii) need for blood transfusions, (iii) venous thromboembolism (VTE)-related hospital re-admissions and deaths, (iv) poorly controlled pre- and post-operative pain, (v) total hip dislocations, (vi) peri-prosthetic fractures and others (vii-x). Each of the 10 sentinel AEs may seem unrelated, yet each AE may lead to another complication and should not be considered individually. Orthopedic ZIOZ targeted these complications and formulated an algorithm that addressed the 10 AEs in total by having all team members involved in the prevention of all AEs. Team members were made aware of all ICPs instituted throughout the entire treatment time by each team member and not just the area of an individual-team members' concern for a patient's care. ZIOZ utilization from 2011-2013 in >2,600 orthopedic implant surgeries, resulted in a total complications reduction to practically zero (hence ZIOZ). Prior to initiation of the ZIOZ program, immediate peri-operative complications had been reported to be as high as 7%. Additionally, ZIOZ reduced the cost of care by greater than 20%.(4)

To help clinicians manage complications, implant dentistry educators have offered continuing education (CE) courses and published >1,100 evidenced-based articles on implant complications from January 2019 to April 2021.(5) CE courses and evidence-based publications have been worthy of our attention. Typically, each of these has focused on addressing complications as single topics and have not integrated implant team members into the process of preventing the specific complication if it occurred outside a particular team members area of concern. Now is the time for the development of a novel, evidence based, multimodal problem-prevention approach to help clinicians manage the stress of frequent "nagging" complications. Remember, the complication rate is 48% of all implants placed over 16 years. With time and an increasing number of implants being placed, the complication rate may lead to the erosion of enthusiasm demonstrated by today's providers and team members.

ZIOZ should be instituted to assure that all team members are aware of how important each treatment step is. All team members are integral to successful implant treatment outcomes. This means; (i) acquiring the best pre-operative records for a thorough evaluation and diagnosis, (ii) development of a comprehensive treatment plan, (iii) correct instrumentation and supply preparation for surgical and restorative phases of treatment, (iv) proper patient education to assure realistic expectations, (v) precise surgical execution, (vi) effective peri- and post-operative pain management, (vii) functional and esthetic prosthetic restorations, and (viii) long-term maintenance. If any one of these steps is not performed properly, it may lead to down-stream complications. ZIOZ with ICPs could benefit implant dentistry's daily challenges with: (i) patient management, (ii) peri- and post-operative pain control, (iii) post-operative infections, (iv) lack of immediate osseointegration, (v) peri-implantitis induced bone loss, (vi) infections occurring once implants are in function and (vii) poor prosthetic outcomes. If all team members understand the importance of each inter-related step, the

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profession may be able to reduce implant-related complications to near zero.

The synergism of multi-modal analgesia allows for lower doses of individual medications to be used while achieving improved pain control. It is the concept that medications with differing mechanism of action can work together for an improved patient outcome. Synergism also occurs when individuals work together on a project, as opposed to being independent of each other. Effective interacting team members often lead to improved project outcomes. This synergism would be possible if implant dentistry works to prevent cumulative, adverse events (AEs) proactively with the use of integrative clinical pathways (ICP). Technology providers could work with Educators to incorporate a ZIOZ computer-based check list to assure that each ICP is accomplished and recorded. Dentistry and orthopedics have shared knowledge regarding implant materials and bone grafting techniques. Now, ZIOZ may be just one more topic to discuss and share.

The ZIOZ concept was recently introduced by Dr. Fennell at the AAID Annual Meeting in Dallas, TX.

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