The patient

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Advancements in technology, the integration of digital workflows, and the use of sophisticated tools like facial scanners have undoubtedly reshaped dentistry.

However, amidst these innovations, patients continue to express fundamental concerns that echo timeless anxieties:

- "Does it hurt?"
- "Will there be swelling?"
- "How long does it take?"
- "Will I feel pain afterwards?"
- "How long will the implants last?"
- "Is there a risk of 'rejection' for reconstituted bone?"

These inquiries transcend mere curiosity; they reveal a deeper reality: patients have emotions. Despite the remarkable technological strides, dentistry's progress hinges on a return to its medical roots, acknowledging and addressing the profound needs of patients. This requires empathetic practitioners who are not only skilled and trained but dedicated to fostering open communication and empathy.

This perspective, often termed "dental medicine," extends beyond technical expertise. It encompasses aspects of behavior, psychology, communication, and theranostic systems. Embracing the "4 Ps" principle (predictive, participatory, preventive, and personalized), it represents a holistic vision of healthcare, recognizing the importance of caring for the patient within the broader healthcare system.

In this context, two keywords stand out prominently:

- **Longevity**
- **Theranostics**.

Longevity is certainly the most ancient and eagerly desired form of human attachment to life. History, art and philosophy offer abundant evidence of the human tendency to fight time and push back aging, with a special emphasis on mitigating its harshest effects.

A deeper look at what longevity means in medicine will help us better frame this concept for our day and age and, above all, for our treatments: "Longevity is the physiological ability of an organism in a given species to survive past the average limit for that species. When looking specifically at humans, the interaction of genetic, environmental and behavioral factors results in individuals surviving for different periods, some past 100 years of age. The interaction of multiple factors in determining the duration of human life means that the

topic must be addressed with a global approach, taking into account biological, genetic, behavioral and environmental perspectives" (Treccani).

Alongside longevity, aging must also be defined, addressing it from a biological perspective. Aging might be defined as follows: "a series of imbalances in homeostasis that leads to a loss of complexity in specific systems. Aging is a continuous phenomenon that starts when an organism, having reached maturity, faces the progressive deterioration of its abilities; it is also a complex phenomenon in which different organs and tissues in the same individual are subject to changes of varying rate and intensity" (Treccani).

The pursuit of longevity, as an integral part of the battle against aging, transcends mere extension of lifespan. It encompasses a broader ambition—to enhance the quality of life in terms of systemic, psychological, and social well-being, promoting active aging. Achieving this goal necessitates a holistic approach, ensuring the global integration of individuals to sustain their well-being and capacity for continued activity. Sciences, ranging from modern nutritional research to cancer-fighting strategies, and from gene editing to studies on induced pluripotent stem cells (Brooks-Wilson, 2013), collectively contribute to this overarching objective.

The quest for longevity transcends traditional boundaries, incorporating advancements in basic biology and epigenetics. This comprehensive approach has contributed to an increase in average lifespan, with projections indicating a significant rise in the percentage of the population aged sixty-five and above by 2030 (ISTAT data). Ongoing studies in nutraceuticals, food sciences, telemedicine technologies for personalized support, and innovative pharmaceuticals are expected to further extend life expectancy. This evolution transforms current geriatric and gerontology practices into the future realm of "medicine of longevity."

This paradigm shift, grounded in rigorous scientific inquiry and detached from fantastical notions of "super humans" or exaggerated expectations, is reshaping goals and trends across all medical sciences.

Even dentistry, specifically rehabilitative dentistry, plays a fundamental role in the great battle against aging. From restorative techniques, to preserving natural dentition, to contemporary additive adhesive implant procedures, from implantology and reconstructive bone surgery to the latest advances in dental aesthetics, dentistry operates as part of the complex longevity machine to improve quality of life and individual well-being. Numerous studies have underscored the importance of rehabilitative implants for improved chewing, which improves the complex neurophysiological system that forms the basis for functional and relational integration.

The use of immediate loading procedures, for example, has achieved a very favorable response in terms of quality of life, patient satisfaction and dissemination among other patients, as a result of the good physical and mental status improvements after treatment (Menassa et al., 2016).

Numerous animal studies have evaluated the increase in brain activity even with the use of just two implants in simple prosthetic rehabilitation.

The recovery of functional activity, paired with the renewed aesthetic, phonetic and social awareness of the patient, offers a significant boost towards achieving overall health.

Other studies have reported elevated well-being and improved quality of life following the use of fixed prosthetics, especially in the mandibular arch, in edentulous or partially edentulous patients.

This underscores the importance of grasping the **mission** of our rehabilitative treatments and planning our procedures with a ***human-centered*** outlook.

Technical and aesthetic objectives cannot be the main focus. The objective must be health.

This message holds particular significance for emerging dentists in an era where values and competition often take a back seat to business objectives and market forces.

Grounded in ethical principles, supported by scientific foundations, and aligned with contemporary medical philosophies, this mission significantly impacts patient health. It distinguishes practitioners by ensuring focused attention and delivering quality care to patients undergoing implant procedures.

Rehabilitating patients with implants goes beyond a **medical** standpoint; it becomes a vital process influencing individual longevity and quality of life.

Offering implants equates to the restoration of functionality to the intricate and captivating organ that is the mouth.

Simultaneously, the "longevity factor" **assumes a central role in the discourse**. The growing trend toward extended lifespans transforms the demographic seeking implant and prosthetic treatments, encompassing a spectrum from straightforward to intricate cases. This population is not exclusively comprised of perpetually healthy, athletic young individuals but includes patients who grapple with various age-related ailments, extensive medication usage, and diverse systemic risk factors (Dellepiane et al., 2020).

This aspect carries relevance for:

- Deciding when and how implant procedures are conducted based on the patient's systemic risk factors.
- Assessing the long-term risk of implant failure in patients with specific conditions or taking particular medications for existing ailments (Campisi et al., 2019).

Addressing the first point, the authors propose a work protocol, published in *Odontoiatria e patologie sistemiche* (Edra), that provides a straightforward and practical personalized approach for each patient and scenario. This protocol, encapsulated in the acronym KDP (know, do, prescribe), considers both standard technical aspects and general risks associated with individual health conditions or medications.

The manner in which dental practitioners address the first visit and take medical histories for each patient requesting a prosthesis or any other surgical procedure, must be redesigned to ensure a "personalized" approach. Having an extensive understanding of the underlying pathology, of the patient's medical history, of any recent health changes and of any treatments taken by the patient is, therefore, important. This information will guide practitioners, within the context of a multidisciplinary approach that includes dialog with the other specialists, as they plan the timing, manner and techniques for the selected treatment.

Diseases that represent a contraindication for an implant must be accounted for, of course, but special emphasis must also be placed on contraindications with potential to complicate the outcome of the treatment or the longevity of the result.

Knowing a patient's health status allows the dental practitioner to plan for **that patient**, considering the clinical, laboratory and medical data available for **that patient** and advancing the objective of a more personalized and predictive approach to dentistry.

Opting for a **graft** that requires extensive reconstruction of hard and soft tissues may be indicated in a 60-year-old atrophic patient who is in good overall systemic health and at most suffers from hypertension or is taking drugs for thyroiditis. Such a patient is not facing multiple systemic complications or comorbidities, is not taking multiple drugs and will be able to tolerate the various surgical procedures that need to be faced for rehabilitation.

On the other hand, this treatment option would be more difficult to manage and less well tolerated by a 78-year-old patient who is receiving treatment for diabetes, hypertension and dyslipidemia and has a history of TIA. Such a patient would require a **graftless** option, which entails fewer implants, shorter time periods, less invasive procedures and, most importantly, fewer surgical procedures, with immediate load procedures being preferred whenever possible (Caramês et al., 2019).

As clinicians transition to the "**do**" phase, they must adopt an integrated approach to the treatment plan, collaborating with medical specialists. This collaboration holds true for patients with conditions such as heart disease, diabetes, and especially metabolic bone diseases.

When considering anesthesiological options, the selection of modern conscious sedation or dental doanalgesia techniques should align with these specific factors. Preparation for the surgical procedure, drug prophylaxis, and intraoperative management aim to minimize complications related to the patient's pathology or systemic condition.

In the "**prescribe**" phase, dentists must navigate drug interactions and consider the patient's underlying diseases.

A common pitfall in dentistry is the tendency to prescribe a particular drug without thorough consideration or resorting to repetitive prescriptions. In contrast, the KDP method emphasizes a deep understanding of the mechanisms behind drug interactions and the impacts of specific treatments. This precision enables effective control over the postoperative course, complications prevention, and a more ethical approach to treatment, addressing broader concerns like antibiotic resistance.

Knowledgeable prescriptions contribute not only to the individual's health but also reflect the ethical nature of the treatment.

Another aspect that needs to be evaluated in terms of **longevity** is ***implant longevity***, i.e., the lifespan of the implant and of the osseointegration in its relation with the patient's systemic health or certain pharmacological treatments. Several discordant views are found in the relevant literature and numerous studies have failed to find statistically significant differences for implant success over time in healthy patients and in patients with poor overall health.

Other studies have noted a problem with implant behavior over time in patients with specific pathologies (diabetes) and who take certain classes of drugs. One example that is very prevalent in the literature is the excessive use of **proton pump inhibitors**, which are widely used in the population for the treatment of gastrointestinal diseases. These drugs are taken for extensive periods of time and interfere with calcium metabolism and bone quality over time. Various studies have, in fact, reported worrying outcomes regarding osseointegration in patients who take these drugs constantly.

Another drug class that needs to be considered is that of **antidepressants**, which can have a negative influence on implant osseointegration over time.

Finally, several classes of new and old drugs have shown specific interference with normal bone metabolism and numerous studies have evaluated their impact on osseointegration and on the induction of peri-implantitis over the short and long term.

This emphasizes the significance of obtaining a comprehensive medical history and tailoring surgical procedures and prosthetic implants based on the patient's medication and any health conditions that may increase the risk of implant failure over time.

The optimal approach involves seeking a delicate **equilibrium** among the patient's well-being, the desired treatment, the procedural risks, and the potential for subsequent failure attributed to specific drugs or health conditions. This approach serves as a compass for **making informed treatment decisions**, considering the evolving landscape of available procedures and the changing demographics of the patient population.

This brings us to our second key concept: **theranostics**, a term in medicine denoting diagnostic procedures utilized as therapeutic options.

The term can be carried over into dentistry to aptly describe the digital workflow and the ability to visualize a prosthetic reconstruction in advance, in accordance with the concepts of guided surgery, minimal invasiveness and selection of the best rehabilitative solution.

Modern integrated technology, incorporating 3D imaging systems and specialized software for implant planning, proves invaluable in anticipating surgical risk factors, particularly in managing volumetric considerations associated with atrophy.

The digital workflow empowers the pre-planning and visualization of the procedure, enabling an assessment of spatial and volumetric aspects, static and dynamic occlusion factors, and their impact on overall appearance. Information seamlessly transitions from a digital diagnostic wax-up to a functional prototype, serving as the foundation for a rehabilitative project. This process exemplifies theranostics, wherein diagnostic tools constitute the core of the therapeutic phase, ensuring a procedure that is straightforward, secure, replicable, and foreseeable.

The result is the coordinated execution of a work plan adequately designed to save time and minimize invalidity.

This allows us to **imagine** the prosthetic solution and understand its future potential: selecting the right pathways for the screws, defining hybrid solutions, planning the angle and type for intermediate abutments, determining the type of temporary prosthesis and choosing the material for the definitive prosthesis.

These are the great possibilities afforded by the digital world, which is capable of receiving, storing and evaluating information that can be shared from the beginning to the end of the treatment plan.

For graftless solutions, in which implants are positioned on residual bone without volumetric reconstruction, especially in the event of extreme atrophy, the volumetric needs, the interactions with soft tissue, the spaces required for hygiene, and the horizontal discrepancies can all be planned. This allows the practitioner to select the type of retention and design the correct emergence profiles and hybrid solutions, when needed.

The integration of modern monolithic materials, particularly monolithic zirconia, has significantly

enhanced prosthetics for several reasons:

- Exceptional mechanical resistance
- Durability against abrasion
- Aesthetic appeal achieved through contemporary **micro-layering** techniques
- Preservation of functional information
- Biocompatibility.

Currently, various graftless solutions with monolithic zirconia are accessible, employing either the **zirconia on zirconia** protocol by Stoppaccioli et al. or a titanium framework supporting monolithic structures featuring new multi-layered zirconia types. These maintain elevated tenacity, excellent biocompatibility, and optical properties.

The primary goal remains unchanged: prioritizing the patient's overall health, ensuring the longevity of both the patient and our implants, prosthetics, and surgical decisions.

Adopting a holistic approach enables precise case selection, recognizing the best treatment through thorough diagnosis and a medical mindset that employs techniques in the service of medicine.

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