Biology is Not Mathematics: The Importance of Individualized Treatment in Orthopaedic

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As Orthopaedic surgeons, we are trained to approach patient problems in a systematic and evidence-based manner. We rely on algorithms, guidelines, and treatment protocols to guide our decisions, and we strive to achieve consistent outcomes across patients. However, as we all know, biology is not mathematics. While it is important to have a structured approach to patient care, we must also recognize the importance of individualized treatment.

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In Orthopaedic, we frequently encounter patients with similar presenting complaints, such as joint pain, fractures, or back pain. However, each patient is unique, with their own set of underlying medical conditions, lifestyle factors, and personal preferences. As such, we cannot expect to treat every patient in the same way.

Consider the example of a patient with hip osteoarthritis. In some patients, a conservative approach may be appropriate, such as physical therapy, weight loss, and analgesic medication. In other patients, surgical intervention, such as a hip replacement, may be necessary to alleviate pain and improve function. However, it is important to consider local lifestyle factors as well. For example, sitting cross-legged or squatting is a common part of daily life in many cultures. In such cases, before considering hip replacement as the only option, hip preservation surgery may be justifiable, despite the higher chances of failure. By taking into account such local factors, we can ensure that our treatment decisions are truly individualized and tailored to each patient's unique needs.

Another example is the decision to perform surgery for degenerative spine disease or spinal stenosis in the elderly population. Unlike in other developed countries, our geriatric population is less demanding and has a larger support system with family and community members who can provide care. Furthermore, our society doesn't have many old-age homes, allowing the elderly to spend their lives more effectively with their family despite foot drops, kyphosis, or degenerative scoliosis. They prefer a conservative approach for these conditions rather than complicated instrumented spine surgeries. Therefore, as surgeons, we should not aggressively follow French Principles of Sagittal Balance in a mathematical view but assess the risk vs. benefit according to the demands of our patients. It is important to make individualized decisions based on the patient's unique circumstances and preferences rather than applying a "one size fits all" approach.

The importance of individualized treatment extends beyond surgical decision-making. In the postoperative period, we must also consider factors such as pain management, rehabilitation, and activity restrictions. While some patients may require intensive physical therapy to regain function, others may be able to achieve similar outcomes with a less aggressive approach.

To achieve truly individualized care, we must also take into account local factors that may impact treatment outcomes. For example, certain populations may be more susceptible to specific conditions, or may have different responses to certain treatments. Research conducted at the local level, and the development of treatment principles based on local evidence, can be crucial in individualizing treatment effectively for our own population. Simply copying guidelines from foreign countries may not be effective, as the cultural and environmental differences can impact treatment outcomes. Ignoring local research led to poor research outcome in low income countries[1].

In conclusion, as Orthopaedic surgeons, we must remember that biology is not mathematics. While we strive for consistency in our treatment approach, we must also recognize the importance of individualized care. By taking into account each

patient's unique set of factors, and the local factors that may impact treatment outcomes, we can improve outcomes and provide the best possible care for our patients.

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