13 Patient Education in Sport Injury and Rehabilitation

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Chapter Objectives

- To introduce the purpose and benefits of patient education.
- To describe the different types, modes, and mediums of patient education in sport injury context.
- To outline the process of integrating patient education into sport injury and rehabilitation.

Introduction

Historically, healthcare has been dominated by the medical model (Engel, 1977), which ascribes to a philosophy of "immediate enforcement of compliance with prescribed regimen" (Redman, 2004, p. 2) that leaves little to no room for patient education (Redman, 2004). In its infancy, patient education was primarily didactic in nature and focused merely on providing biomedical advice (Wittink & Oosterhaven, 2018). This formative application of patient education has not been found to be highly effective and, at times, even counterproductive to patient outcomes. However, when patient education is used as a cognitive behavioral intervention strategy within biopsychosocial patient-centered care (Hashim, 2017; O'Neill, 2022), it looks and feels very different for both the patient and the healthcare provider. The purpose of this chapter is to discuss how patient education within patient-centered care can be beneficial for sport injury and rehabilitation. More specifically, this chapter will (a) define and introduce the purpose of patient education within sport injury, (b) discuss biopsychosocial benefits of effective patient education, (c) introduce different types, modes, and mediums of patient education in the sport injury context, and (d) outline the process of integrating patient education into sport injury and rehabilitation.

Construct Definition and Purpose

According to Bartlett (1985), patient education is "a planned learning experience using a combination of methods such as teaching, counseling, and behavior modification techniques which influence patients' knowledge and health behavior" (p. 323). More recently, a shift toward patient-centered education has taken place – where the education content is "*about* the patients, *with* the patients, and *for* the patients" (Hearn et al., 2019, p. 934), with a goal to ensure medical professionals "remain sensitive to all of the needs of the people they care for" (p. 934). In the context of sport injury, effective patient education typically involves two-way communication

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between the athlete and various individuals involved in the rehabilitation process. These individuals include sports medicine professionals (SMP), sport professionals (SP), sport psychology professionals (SPP), and other significant persons in the athlete's life (e.g., parents, teammates, other family members; Stiller-Ostrowski & Kenow, 2014).

Benefits of Effective Patient Education

Consistent with the theoretical models presented in this book (see Chapters 2–6 and 19–20), patient education is a cognitive behavioral intervention that can influence both injury risk factors and a number of psychosocial responses to injury, rehabilitation, and return to participation. Most notably, patient education increases *knowledge*, which has been found to facilitate patient perceptions of competence and autonomy. Patient education is also a *shared experience* which can facilitate perceptions of relatedness (see self-determination theory; Ryan & Deci, 2002). Satisfaction with self-determination theory's three basic psychological needs (i.e., competence, autonomy, and relatedness) has been found to be associated with motivation, which is positively related to various mental and physical health outcomes (e.g., Ng et al., 2012; Podlog & Brown, 2016). Increased *knowledge* can also influence numerous cognitive appraisals and, thus, emotional and behavioral responses associated with injury (see the integrated model of psychological response to the sport injury and rehabilitation process; Wiese-Bjornstal et al., 1998). For example, Russell and Tracey (2011) found lack of understanding of injury (cognitive appraisal) was of great concern for injured athletes and a source of apprehension (emotional response) during rehabilitation. They also found *knowledge* of various behavior-focused factors, such as (a) treatment duration, (b) return to participation timeline, (c) premature return to participation risks, and (d) importance of rehabilitation adherence, were "helpful and reduced anxiety about future sport participation" (Russell & Tracey, 2011, p. 19).

Outside of sport injury, similar anxiety-reducing effects have been found (Hoving et al., 2010; Visser et al., 2001), along with other positive benefits. For example, effective patient education has been found to positively influence experiences of immunotherapy treatment outcomes and temper exaggerated patient expectations (Ihrig et al., 2023). Patient education has also been observed to increase knowledge about and improve attitudes toward receiving vaccines (Chou et al., 2014), in addition to aiding adherence to medication (Jankowska-Polańska et al., 2016). Patient education is also understood to positively influence communication and vice versa. This is important because communication is an antecedent for trust and rapport, both of which are essential ingredients of the patient–practitioner relationship within patient-centered care (Ayers & de Visser, 2018; Katz & Hemmings, 2009; Stiller-Ostrowski & Kenow, 2014). Importantly, improved communication (Louw et al., 2011) and trust in the healthcare professional (Birkhäuer et al., 2017) have been linked to better rehabilitation outcomes, thus highlighting the value of patient education as a staple intervention during rehabilitation. In fact, an evaluation of existing systematic reviews and meta-analyses found the impact of patient education in chronic diseases and obesity health outcomes was 50–80% (Lagger et al., 2010). Further, research has shown patient education can be optimized as an intervention in the treatment of specific musculoskeletal conditions. For instance, for patients diagnosed with patellofemoral pain (PFP), a recent systematic review and meta-analysis found, when combined with other treatment modalities, patient education was most effective at three months following PFP diagnosis (Winters et al., 2021). Moreover, the positive effects of patient education on health outcomes have included decreased pain and disability (Louw et al., 2011) and increased quality of life (Lagger et al., 2010).

Consequences of Ineffective Patient Education

In contrast, Forbes et al. (2021) stated ineffective patient education has been linked to poorer rehabilitation outcomes (Barwick et al., 2012), increased hospital readmissions (Hari & Rosenzweig, 2012), misuse of medications (Cumbler et al., 2009), and decreased patient satisfaction (Montini et al., 2008). Most recently, patient education of low back pain and the use of negative language within delivery of the education was found to increase patient anxiety and illness beliefs (Linskens et al., 2023) – evidence the words used in patient education can have profound consequences on rehabilitation. To aid in more effective patient education, Stewart and Loftus (2018) discuss words to avoid and suggested alternatives when delivering patient education in the realm of musculoskeletal rehabilitation.

Patient Education in Sport Injury Rehabilitation

Research has shown patients outside of sport (e.g., Hafsteinsdottir et al., 2011), and in sport (Russell & Tracey, 2011), want education on their condition, rehabilitation, and return to participation process from their treatment providers. In sport, patient education typically takes place in four main sport injury rehabilitation contexts: (a) initial intake evaluation, including medical history interviews; (b) physical examination and diagnostic testing; (c) before, during, and after treatment; and (d) when making medical recommendations (see Brewer & Redmond, 2017). It is also common for patient education to be provided by various SMPs, SPPs, and SPs. As part of the patient education process, they may educate athletes about the numerous internal and external risk factors that could have predisposed or made the athlete susceptible to sport injury. Pertinent intrinsic injury risk factors include age, previous injury, strength, and neuromuscular control (Brewer & Redmond, 2017). Other injury risk factors include maladaptive psychosomatic stress response to stressful situation(s), insufficient coping skills, and/or lack of psychological interventions (Ivarsson et al., 2017). Typical extrinsic risk factors include the environment (e.g., weather), equipment (e.g., mouthguards), and numerous sport-related factors (e.g., rules, playing surface). Recently, the importance of adequate nutrition (e.g., Turnagöl et al., 2022), sleep (e.g., Huang & Ihm, 2021), and rest and active recovery (e.g., Children's Hospital of The King's Daughters Sports Medicine & Gilmartin, 2021) have also been highlighted as injury-protective factors, and are thus likely to be topical content for injury prevention education, and also pertinent to patient education as part of injury rehabilitation.

Types of Patient Education

The type of patient education used in sport injury settings can be formal, non-formal, or informal. Formal education is planned and structured and designed by content experts. Non-formal education is planned, but not to the extent as formal education, and is often focused on offering practical knowledge. Non-formal education is typically delivered by subject experts and can take place in a myriad of flexible ways in a number of situations. Informal education is unplanned and unstructured and can be learned from anyone (e.g., from another athlete's personal experiences with injury) and does not involve "fact-checking" of the information.

The types of patient education can be delivered directly (e.g., person-to-person), indirectly (e.g., through technology, such as mobile applications), or via a combination of directly and indirectly (Akoit & Pandin, 2021). The focus of the patient education being delivered directly, indirectly, or in combination can be general (e.g., focused on generic information about the injury or rehabilitation process) or specific (e.g., focused on the patient's individual needs) and

Table 13.1 Examples of Non-Verbal Communication

Kinesics *Non-verbal communication*	*Proxemics* *Communication through space*	*Paralanguage* *Vocal components of speech*
Physical appearance	Proximity to the patient	Pitch
Punctuality	Intimate zone (0–18 in/0–50 cm)	Resonance
Body posture		Articulation
Gestures	Personal zone (18–48 in/50–120 cm)	Tempo
Touch		Volume
Facial expressions	Social zone (48 in – 12 ft/1.20 cm-3.7 m)	
Smells and scents	Public zone (Greater than 12 feet/3.7 m)	

Source: Adapted from Brewer and Redmond (2017).

aimed to educate an individual (e.g., the athlete, caregiver, sport coach) or collective group of individuals (e.g., sport team, interprofessional practice team). Depending on the desired outcome and the target audience, patient education can be delivered in-person in real time or virtually, both synchronously and asynchronously.

Modes of Patient Education

Rooted in the basics of communication (Stiller-Ostrowski & Kenow, 2014), effective patient education generally involves and is influenced by verbal and non-verbal modes of communication. Verbal communication includes both spoken and written words, whereas non-verbal communication includes three overarching dimensions – kinesics, proxemics, and paralanguage (Brewer & Redmond, 2017; see Table 13.1).

Effective patient education also considers elements of the basic two-way communication cycle: the *sender*, who communicates the *message* to the *receiver*, who responds with *feedback message* to the *sender*. This message–feedback loop involves *encoding* (i.e., selection of words, actions, gestures, and expressions) and *decoding* (i.e., a process of observation and interpretation of the encoded message) from both the sender and the receiver (Stiller-Ostrowski & Kenow, 2014); see Figure 13.1. Encoding and decoding will also involve cognitive, affective, and behavioral processes and responses.

Mediums for Patient Education

In general, patient education can be delivered through different overlapping mediums, such as oral, written/printed, audio, audiovisual, and kinesthetic methods. Table 13.2 provides select examples of patient education materials, as identified in the wider medical patient education literature.

Patient education mediums can incorporate multiple senses, such as hearing and sound, touch, itch, pressure, and sight. In the context of sport injury education, a number of other psychophysiological sensations and perceptions can also be evoked, when applicable. These include external and internal sensory systems, such as the vestibular system, spatial orientation, nociception, proprioception, equilibrioception, thermoception, as well as sense of stretch and tension.

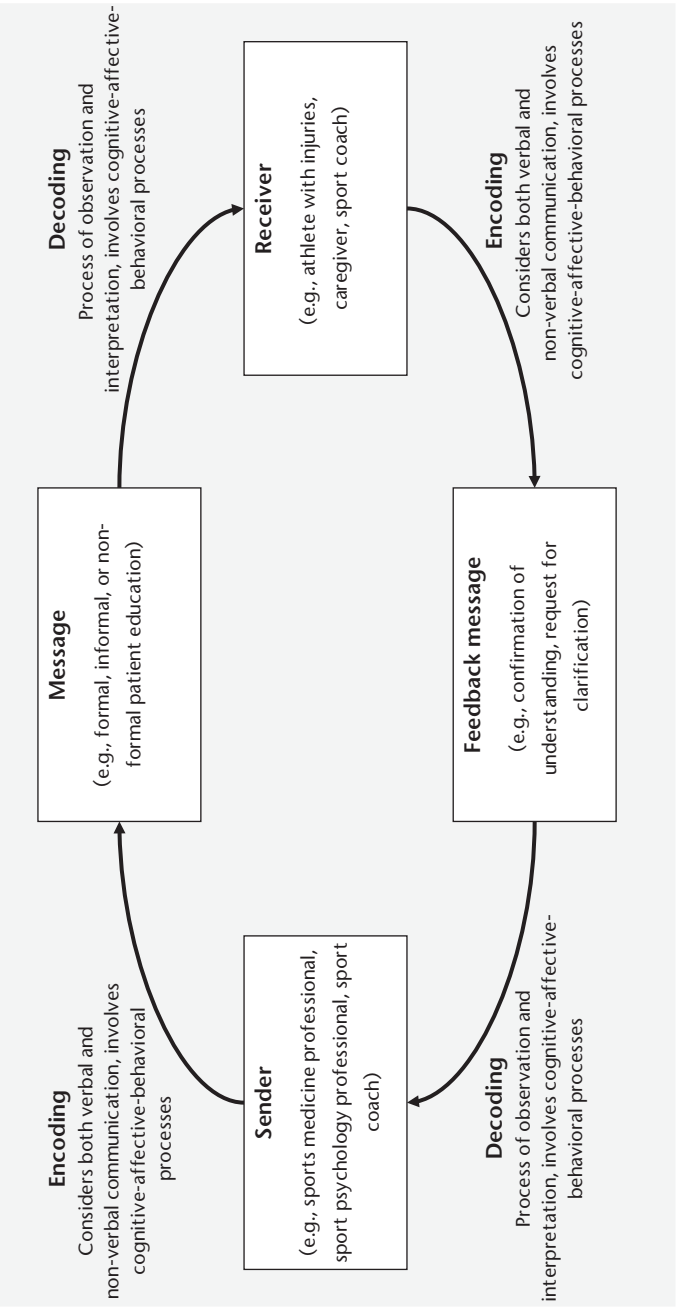

Figure 13.1 Basic communication cycle adapted to sport injury.

Table 13.2 Overview of Select Patient Education Mediums

Mediums	*Description*	*Evidence Base*
Lectures	Educational talks aimed at a particular audience, typically didactic in nature; delivered in-person and virtually, and with the help of technology, made available for asynchronous viewing.	Moderate effect on general patient outcomes compared to routine care (Theis & Johnson, 1995).
Discussions	Conversation/dialogue between two or more people; common way to deliver patient education to individuals and small groups; can take place in-person and virtually; in sport, performance-enhancement groups for athletes have been proposed to mitigate psychological distress associated with injuries (Clement et al., 2011).	Small to moderate effect size on general patient outcomes compared to routine care (Theis & Johnson, 1995).
Storytelling	Communicating a story in written, oral, electronic, or visual way to enable understanding of self or situation; helps organize thoughts, provide meaning to a lived experience, and elicit biological, emotional, and behavioral responses in the reader/listener (McCann et al., 2019).	Not yet empirically studied.
Metaphors and quotes	Metaphors are implied comparisons that help convey abstract experiences in a concrete manner (Lakoff & Johnson, 1980). Inspirational quotes combine the "art" and "science" (Cutilli, 2020) of patient education to convey key messages simply.	Not yet empirically studied.
Fact sheets and other illustrated material	Written materials, such as informational leaflets, brochures, packages or booklets, infographics, home exercise sheets, websites, and smartphone wallpapers.	Written patient education material has been found to improve patient knowledge (Friedman et al., 2011) and have a small to moderate effect on general patient outcomes compared to routine care (Theis & Johnson, 1995).
Audio materials	Educational information presented via audio recordings in the form of audiotapes, podcasts, and audiobooks.	Mixed findings for audiotapes (Friedman et al., 2011; Santo et al., 2005); however, a moderate effect on general patient outcomes compared to routine care (Theis & Johnson, 1995).
Audiovisual	Delivery of patient education through combined audio and video mediums, such as video recordings, TedTalks and YouTube videos, documentaries, and sport-related movies.	Video-based patient education intervention findings are mixed for increasing knowledge (Friedman et al., 2011), with no effect on anxiety (Trevena et al., 2006); however, videotapes have a small to moderate effect size on general patient outcomes compared to routine care (Theis & Johnson, 1995).

Mediums	*Description*	*Evidence Base*
Mobile device apps	Applications for smartphone and tablet devices designed to provide information about anatomy, conditions, and treatments; facilitate communication between different members of the rehabilitation team; aid in stress management, cognitive reframing, and tracking goal achievement and relevant rehabilitation behaviors. Note, many apps are not evidence-based; as such, always discuss with a healthcare provider in advance of use to ensure app is valid and appropriate for intended use.	Use of mobile device apps has transformed, and continues to transform, many areas of healthcare (Ventola, 2014); however, they have not yet been empirically studied in a sport rehabilitation context.
Demonstrations, stimulations, and games	Include use of 3D models, role-playing, modeling, use of simulated games, active video gaming, and so on.	No efficacy data for simulated games or role-playing has been found (Friedman et al., 2011), though demonstrations used for patient education have a large effect size on general patient outcomes compared to routine care (Theis & Johnson, 1995).

Patient Education Processes for Sport Injury and Rehabilitation

Drawing from existing literature (Agency for Healthcare Research and Quality, 2020; American Academy of Family Physicians et al., 2000; Morris, 2022), a core principle of patient education is having the requisite skills to *assess*, *plan*, *implement*, and *evaluate* (Cutilli, 2020) effective patient education interventions. What follows is a brief introduction to each in the context of sport injury and rehabilitation.

Assessment

The goal of *assessment*, within patient education, is to gain information on the educational and personal needs of the patient and determine how to best provide holistic person-centered education for the patient. In the context of injury rehabilitation, assessment typically involves the use of various objective and subjective intake forms and assessments (for a list of psychosocial assessments in sport injury, see Arvinen-Barrow et al., 2018) with the patient, as well as the use of various foundational interpersonal counseling skills (see Chapter 9). Depending on the healthcare professional's educational background and competencies, rehabilitation-focused assessment may also include the use of specific counseling approaches (e.g., motivational interviewing; Miller & Rollnick, 2013). Within the rehabilitation process, regardless of whether patient education is used for injury prevention or rehabilitation, assessment should be used to decipher patient preferences in individual learning styles, readiness to learn, and potential barriers for learning (e.g., learning disabilities, language barriers). Knowledge of these will inform the healthcare provider's planning for patient education.

Planning

The goal of *planning* is to use the knowledge gleaned from assessment(s) to inform the design of patient education materials and approaches. Well-planned patient education materials and approaches have clear purpose and outcomes, meet the patient where they are at in the rehabilitation process, and are within the scope of their abilities. Planning for effective patient education must consider pedagogical theory, patient preferences in individual learning, and scientific evidence when determining the content, types, modes, and mediums of how patient education will be delivered. Prior to implementing printable or audiovisual patient education materials, it is advisable to systematically evaluate the content developed or sourced for understandability (i.e., patient comprehension, like reading level, appropriate vocabulary) and actionability (i.e., that will aid patient rehabilitation behavior). For more on evaluating patient education materials, see Agency for Healthcare Research and Quality (2020b).

Implementation

The goal of *implementation* is to systematically incorporate the patient education plan into sport injury prevention, rehabilitation, and/or return to participation process. Implementation requires systematic commitment to the patient education process and relies on evidence-based materials and relevant knowledge from related fields (e.g., marketing, graphic design, audiovisual technology; Cutilli, 2020) while considering universal health literacy precautions (Agency for Healthcare Research and Quality, 2020a). Altogether, well-implemented patient education can aid in facilitating positive patient education outcomes.

Evaluation

The goal of *evaluation* is to appraise both strengths and challenges of the implemented patient education. Facets of patient education to consider include an assessment of the appropriateness of the educational materials and implementation processes, degree to which the intended purpose and outcomes were met, level of patient satisfaction, and extent to which patient understanding was aided and knowledge increased. Equally, it is imperative to identify patient education barriers and determine a plan for modification or revision to reduce patient education challenges.

Selected Guidelines for Effective Patient Education

In addition to having content expertise and understanding of pedagogical principles of teaching and learning, existing patient education literature (Agency for Healthcare Research and Quality, 2020a; American Academy of Family Physicians et al., 2000; Morris, 2022) highlights several interpersonal factors important for effective patient education. These include *attitudes* toward patient education, *identifying* barriers to learning, and *using strategies* to promote trust, rapport, and engagement. Table 13.3. provides selected guidelines for effective patient education as identified in the wider patient education medical literature.

Table 13.3 Selected Guidelines for Effective Patient Education

Guideline	*Rationale*	*Selected Evidence*
Communicate clearly.	Breaking educational information into small, manageable pieces can aid understanding and comprehension.	Stiller-Ostrowski and Kenow (2014)
Keep it simple; avoid medical jargon; assess, select, and create easy-to-understand patient education materials.	Injured athletes will have varying degrees of understanding of their injury, recovery, and rehabilitation. Keeping messaging simple can enhance understanding and alleviate maladaptive psychosocial responses.	Agency for Healthcare Research and Quality (2020a); Stiller-Ostrowski and Kenow (2014); van der Scheer-Horst et al. (2023)
Use structured, tailored, and interactive multi-modal patient education interventions.	Using multiple patient education mediums together can be more effective than when used in isolation.	Theis and Johnson (1995); Trevena et al. (2006)
Identify patient can'ts and can-dos.	Framing rehabilitation activities in a positive manner can facilitate sense of control and autonomy and facilitate positive rehabilitation outcomes.	Wilkoff (2022); see also Chapter 15 on self-talk
Build trust and rapport.	Trust associated with patient satisfaction, health behaviors (e.g., adherence), quality of life, and symptom severity.	Birkhäuer et al. (2017)
Check patient understanding.	Using the teach-back method and asking questions can facilitate greater patient understanding and affords quick corrections in case of misunderstanding.	Agency for Healthcare Research and Quality (2020a); Morris (2022); Trevena et al. (2006)
Consider language-related and other communication barriers.	Writing information down and in the patient's native language can be highly influential in increasing understanding and comprehension.	Morris (2022)
Consider culture, customs, and beliefs.	Cultural differences affect health beliefs and outcomes.	Mhaimeed et al. (2023); Morris (2022); see also Chapter 11
Patient education should be a continued process that includes follow-ups.	Long-term, regular patient–clinician relationship can facilitate behavior change.	Agency for Healthcare Research and Quality (2020a); American Academy of Family Physicians et al. (2000)

Conclusion

Patient education is a cognitive behavioral intervention integral to holistic injury prevention and the rehabilitation process. By combining the "art" and "science" of injury knowledge and communication, patient education can both set and temper expectations, increase personal agency, and positively affect injury outcomes. When done effectively, patient education is "simple, patient centered, and multi-modal [aimed] to meet the health literacy needs of patients/caregiver" (Cutilli, 2020, p. 267).

Case Study

Esti, a 14-year-old competitive swimmer, felt pain in her right foot while warming up at a local swim meet. "Someone kicked me, and now my toe hurts," Esti told her coach and mom. On closer inspection, all of her toes looked normal, with no signs of swelling or bruising. When palpated or flexed, Esti reported mild discomfort but no pain on her second phalange. "It is up to you whether or not you want to race," says Esti's mom. "If your toe is indeed broken, not much will be done to it. You can always take it one race at a time and see how it feels." Over the next two days, Esti swam all her races and did not think much of the toe. Two days later, she woke up with her toe swollen and bruised purple. Esti's mom made an appointment with a local orthopedic surgeon known to work with athletes. The following is a transcription of the appointment.

"Hi, Esti. I am Dr. Luu. What brings you here?"

Esti replies, "My toe hurts. Someone kicked me while warming up at a swim meet – now it's swollen and bruised. I want to know what is wrong with it and how long it will take to heal."

Dr. Luu responds, "Let me have a look."

While Esti is taking her shoes and socks off, Dr. Luu picks up one of her shoes from the floor and turns it around in his hands before placing the shoe back on the floor. While examining Esti's toe, he remarks, "Those are cool shoes. I like the thick soles. Very nice." He then says, "Do you know what a toe is made of?" Esti sits silent and shakes her head. Dr. Luu says, "A toe has three bones, and inside those bones are blood vessels. There are a couple of joints, and they move because of tendons that help the toes flex or extend. The bones are also surrounded by skin."

Esti asks, "Is my toe broken? If it is, how long will it take to heal?"

Dr. Luu answers, saying, "Well, since there are no muscles in your toe, and knowing what a toe is made of, when you see this much bruising, it's usually an indication there is a fracture of some kind. But I don't know for sure. Let us take an X-ray to confirm."

The X-ray confirms an acute fracture in the second phalange. Esti looks worried and immediately asks, "How long will it take to heal?"

Dr. Luu pauses and says, "It sounds like you are in a hurry," and then inquires, "Why are you in a rush?"

Esti says, "I have state swimming championships in two weeks, and two weeks after that, I am going to junior nationals. I need to know that I can continue to swim."

Dr. Luu responds, "I would be worried if you were an Irish dancer, and you had that broken toe. But you are not an Irish dancer, so [as a swimmer] you can train as much as your pain allows. I have seen many of these [broken] toes, and each and every one of them has eventually healed as normal."[1]

Esti looks relieved and turns to her mom and smiles a little. Dr. Luu then presents several options to Esti and says, "There are a couple of things you can do here. You can get crutches and a boot if you want to take some pressure off that toe. Or you can continue using those cool shoes you have, because they have thick, supporting soles. At swim practice, you can tape two toes together for support, but that might just feel weird."

Questions

1. What kinesics, proxemics, and paralanguage did you imagine Dr. Luu to be using as you read the case study? What effect did you imagine these to have on Esti cognitively, emotionally, and behaviorally?
2. What mediums of patient education did Dr. Luu use with Esti?
3. What additional patient education mediums could Dr. Luu have used with Esti that would likely have been beneficial, and why?
4. Considering the process of patient education, identify and justify what psychological and sociocultural factors made Dr. Luu's patient education intervention effective.

Note

1 This quote is cited from Arvinen-Barrow, M., Clement, D., & Hemmings, B. (2020). "This is the final jump," I respond. Why, why do I utter those words? Using storytelling in sport injury rehabilitation. In W. Ross (Ed.), *Sport injury psychology: Cultural, relational, methodological, and applied considerations* (pp. 207–216). Routledge. https://doi.org/10.4324/9780367854997 (p. 212).

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