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Artificial intelligence in patient education: A comparative analysis of ChatGPT-5 and DeepSeek for tibial plateau fracture frequently asked questions

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Abstract

This study aimed to compare the responses of ChatGPT-5 and DeepSeek Chat Space to frequently asked questions (FAQs) regarding tibial plateau fractures, focusing on quality, reliability, and readability. A total of 15 FAQs were identified based on clinical expertise and patient-oriented online sources. These questions were submitted to ChatGPT-5 and DeepSeek in separate chat sessions, and responses were recorded without follow-up prompts. The outputs were evaluated using the Ensuring Quality Information for Patients (EQIP-20) and Global Quality Score (GQS) for quality, the Modified DISCERN Scale for reliability, and nine established readability indices. DeepSeek achieved significantly higher scores than ChatGPT-5 in both EQIP-20 (median 87.5 vs. 80.0, p=0.006) and GQS (median 5.0 vs. 4.0, p=0.001). For reliability, both models showed the same median DISCERN score (3.0), but DeepSeek's results were more consistent, whereas ChatGPT-5's responses were more variable (p=0.041). Readability analyses revealed that both models generated texts requiring high school to university-level comprehension, well above the recommended sixth grade reading level. Significant differences were observed in the Coleman–Liau Index, Simple Measure of Gobbledygook, Overall Language Weight, and Long Word Grade metrics. Both ChatGPT-5 and DeepSeek provided generally satisfactory responses regarding tibial plateau fractures. However, DeepSeek performed better in terms of quality and reliability, while ChatGPT-5 produced responses with greater variability. Despite these strengths, the outputs of both models were too complex for the average patient population, underscoring the continued need for physician oversight in patient education.

Keywords: Artificial intelligence, chatgpt, deepseek, tibial plateau fractures, quality assessment, reliability, readability

Introduction

With the integration of artificial intelligence (AI) applications into daily life, studies exploring their potential use in healthcare have progressively increased. Early research primarily focused on evaluating AI performance in examinations designed for physicians [1,2]. The successful outcomes of AI in these assessments suggested its potential benefits across various domains of healthcare. In this context, investigations have been conducted on the application of AI in clinical processes such as triage in emergency departments and the reporting of radiological images [3,4].

It is common for patients to seek health-related information on the internet. Previous studies have examined the use of websites, forums, and platforms such as YouTube for this purpose [5,6]. However, the literature has demonstrated that these sources may be unreliable. The development of AI-based tools has therefore introduced a new potential avenue for patients to access reliable and up-to-date information. In this regard, Mika et al. directed frequently asked questions (FAQs) regarding total hip arthroplasty to ChatGPT and evaluated the reliability and readability of the responses [7]. In their study, the majority of the responses were found to be evidence-based and unbiased; however, some answers required revision. Additionally, the responses were generally written at a readability level understandable to most patients and were considered a potentially useful adjunct for patient education. Similarly, FAQs related to both specific and general medical conditions; including total knee arthroplasty,

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anterior cruciate ligament injuries, boxer's fractures, anesthesia, and pain have been posed to AI, with subsequent analyses [8-12]. These studies have shown that responses generated by ChatGPT and similar AI models are generally understandable and well-structured. However, variability has been reported in terms of accuracy, completeness, and clinical applicability, and it has been emphasized that these tools should not replace professional medical consultation.

In a study investigating the use of artificial intelligence in answering patient-oriented frequently asked questions related to robotic-assisted total knee arthroplasty, ChatGPT and Google were compared in terms of response quality, clinical relevance, and readability. The results demonstrated that although AI-based tools are generally capable of producing accurate and readable responses, there was notable variability in response quality, and certain limitations persisted with regard to clinical applicability and contextual accuracy [13].

In addition, patient-oriented AI applications that provide direct information or address frequently asked questions remain limited in the literature, particularly in the context of acute orthopedic trauma and fractures, where existing studies mainly focus on diagnostic and treatment support. Therefore, evaluating the quality and reliability of AI-generated information in complex traumatic conditions is important for both clinical reliability and patient education. In this context, tibial plateau fractures and AI-based responses to patient-oriented frequently asked questions were specifically selected as the focus of this study. These fractures are common and clinically complex injuries, often requiring clear explanations regarding surgical indications, weight-bearing protocols, and recovery expectations. Patients frequently seek information online; however, available resources are often inconsistent or difficult to understand. Moreover, as these injuries often require timely clinical decision-making, access to accurate and comprehensible information is particularly important.

Particularly in emergency departments, where the need for rapid access to information in complex clinical scenarios is substantial, AI technologies are thought to offer significant contributions. Tibial plateau fractures represent one of the most common fractures encountered in emergency settings and are especially prevalent during the fifth and sixth decades of life [14]. In such fractures, challenges exist not only in diagnosis and treatment but also in ensuring patients' access to accurate, reliable, and comprehensible information. This study aims to explore the potential role of AI technologies in this area by directing FAQs about tibial plateau fractures to frequently used 2 AI-based models and evaluating the reliability, quality, and readability of the generated responses.

Material and Methods

Ethics approval was not required for this study because it involved no human participants, patient data, or interventions, and consisted solely of evaluating outputs generated by artificial intelligence models.

The identification of FAQs by patients in the emergency department was carried out by an experienced orthopedic surgeon working at a high-volume trauma center together with an experienced emergency physician, and scoring decisions were reached by consensus. To ensure a systematic process, the investigators first searched Google using the terms "tibial plateau fracture," "tibial plateau fracture treatment," and "tibial plateau fracture recovery." The first 10 websites appearing in each search were screened, including hospital information pages, academic medical centers, and publicly accessible patient education platforms.

From these sources, patient questions were extracted and categorized. Questions appearing on at least two separate websites or frequently encountered in clinical practice were defined as "frequent." Inclusion criteria were: (1) directly related to tibial plateau fractures, (2) patient-oriented, and (3) phrased as a question. Exclusion criteria were: (1) duplicate questions with identical meaning, (2) questions intended for clinicians rather than patients, and (3) content unrelated to diagnosis, treatment, recovery, or prognosis. Through this combined approach, a final list of 15 frequently asked patient questions regarding tibial plateau fractures was compiled and included in the study. The final list of frequently asked patient questions included in the analysis is presented in (Table 1).

Table 1. Frequently asked patient questions regarding tibial plateau fractures

No.	Question
1	What is a tibial plateau fracture?
2	Why did the tibial plateau fracture happen?
3	Is a tibial plateau fracture a serious injury?
4	Can I walk on a fractured tibial plateau?
5	Is surgery absolutely necessary for a tibial plateau fracture?
6	If I have surgery for a tibial plateau fracture, will metal plates or screws be used, and will they need to be removed later?
7	After surgery for a tibial plateau fracture, how long will the pain last?
8	After a tibial plateau fracture, when will I be allowed to bear weight on my leg?
9	How long will it take for a tibial plateau fracture to heal?
10	After a tibial plateau fracture, will I be able to walk normally again?
11	After a tibial plateau fracture, how long will I need to use crutches or a walker?
12	After a tibial plateau fracture, will I need physical therapy?
13	After a tibial plateau fracture, when can I go back to work?
14	After a tibial plateau fracture, will I be able to return to sports?
15	What are the possible complications of a tibial plateau fracture?

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These 15 questions were subsequently submitted to both ChatGPT-5 and DeepSeek, with each question posed in a new chat session. No follow-up prompts were provided, and all responses were recorded. The responses were then evaluated in three categories: quality, reliability, and readability.

Two scales were used for quality assessment: the Ensuring Quality Information for Patients (EQIP-20) [14,15] and the Global Quality Score (GQS). EQIP-20 is a 20-item quality assessment scale, in which each item is scored as "yes" (1 point), "partially" (0.5 points), or "no" (0 points). Items deemed irrelevant to the content under evaluation were excluded from scoring. Based on the total score, a percentage range of 76–100% indicates "well written," whereas 0–25% indicates "serious quality concerns" [16]. GQS is a widely used method for evaluating the quality of online content, scoring sources on a 5-point scale (1: poor quality, 5: excellent quality) [17]. For reliability assessment, the Modified DISCERN Scale was used. This scale includes five items, each scored with 1 point if the criterion is met, with a maximum score of 5 representing the highest level of reliability [18].

Readability was assessed using nine different indices calculated via ReadabilityFormulas.com (Calculator 1). The ARLC (Average Readability Level Composite) represents the average grade level across all tests, while the ARI (Automated Readability Index) estimates the educational level required based on word and sentence length. The FRES (Flesch Reading Ease Score) rates the ease of reading on a scale from 0 to 100, whereas the Gunning Fog Index considers sentence length and the proportion of complex words to estimate years of formal education required for comprehension. The SMOG (Simple Measure of Gobbledygook) index estimates educational years needed based on the frequency of polysyllabic words, while the Coleman–Liau Index calculates grade level from the number of letters per word and average sentence length. The FKGL (Flesch–Kincaid Grade Level) uses sentence length and syllable count per word to indicate grade level required for understanding. The OLW (Overall Language Weight) measures the overall "linguistic load" of the text by integrating word length, sentence length, and lexical density. Finally, the LWG (Long Word Grade) assesses grade level based on the proportion of long words in the text. Collectively, these metrics aimed to objectively evaluate the linguistic complexity of the responses and their suitability for the target population.

Statistical Analysis

The data obtained in this study were analyzed using Jamovi version 2.5 (The Jamovi Project, Sydney, Australia). Descriptive statistics were presented as mean ± standard deviation for continuous variables with normal distribution, and as median (interquartile range, IQR) for those without normal distribution. The assumption of normality was tested using the Shapiro–Wilk test. For comparisons of variables with parametric distributions, the paired t-test was employed, while the Wilcoxon signed-rank test was applied for non-parametric distributions. A p-value of <0.05 was considered statistically significant.

Results

The AI-generated responses to the 15 frequently asked questions evaluated in this study, along with their corresponding quality (EQIP-20, GQS) and reliability (Modified DISCERN) are presented in detail in Table 2.

Quality Assessment

Overall quality assessment demonstrated a clear difference between the two AI models. According to EQIP-20 scores, the DeepSeek model achieved significantly higher overall quality compared to the ChatGPT-5 model (median: 87.50 [IQR: 4.58] vs. 80.00 [IQR: 11.2], p=0.006). In addition to higher median scores, DeepSeek responses exhibited a narrower interquartile range, indicating more consistent quality across the evaluated questions.

Similarly, evaluation using the Global Quality Score (GQS) revealed superior performance of DeepSeek (median: 5.0 [IQR: 0.0]) compared with ChatGPT-5 (median: 4.0 [IQR: 0.0], p=0.001). While both models generally produced responses of acceptable to high quality, DeepSeek more frequently reached the highest possible GQS rating (Table 3).

Reliability Assessment

Reliability assessment using the Modified DISCERN scale showed comparable median scores for both models (median: 3.0); however, the distribution of scores differed significantly (p=0.041). DeepSeek responses demonstrated a narrower interquartile range, reflecting greater consistency in meeting reliability criteria across different questions. In contrast, ChatGPT-5 responses showed wider variability, producing both higher and lower reliability scores depending on the question (Table 4).

Readability Assessment

Readability analysis revealed broadly comparable overall readability levels between ChatGPT-5 and DeepSeek. The ARLC scores did not differ significantly between models (p=0.751), indicating similar overall educational grade-level requirements. Likewise, no statistically significant differences were observed for ARI, FRES, Gunning Fog Index, or FKGL scores, suggesting comparable sentence structure and word complexity across most standard readability indices. In contrast, significant differences were identified in several specific readability metrics. DeepSeek responses demonstrated higher Coleman–Liau Index and OLW scores, indicating increased linguistic density and letter-based complexity. Conversely, ChatGPT-5 responses yielded higher SMOG and LWG scores, reflecting a greater proportion of polysyllabic and longer words. These findings highlight distinct linguistic patterns between the two models despite similar overall readability levels (Table 5).

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q1	Answer	A tibial plateau fracture is a **break in the upper part of the tibia (shinbone)**, where it meets the knee joint. This region—the tibial plateau—is important because it supports your body's weight and plays a major role in knee movement and stability. **Key points:** **>Location:** The fracture occurs at the flat, top part of the tibia, which forms the lower half of the knee joint. **>Involves cartilage:** The tibial plateau is covered with articular cartilage, so these fractures often extend into the joint and can damage the cartilage surface. **>Mechanism of injury:** Often caused by high-energy trauma (like car accidents or falls from height) or, in older adults with weaker bones, by low-energy falls. **>Symptoms:** Pain, swelling, inability to bear weight, and sometimes deformity of the knee. **>Risks:** Because the fracture involves the knee joint, it can lead to joint instability, arthritis, and reduced range of motion if not treated properly. **>Treatment:** Depends on fracture severity—ranging from immobilization and physical therapy for minor cases to surgery for displaced or unstable fractures. If you'd like, I can also make a **simple diagram** showing where exactly the tibial plateau is and how it breaks. Would you like me to do that?	A **tibia plateau fracture** is a break in the top part of the **tibia (shinbone)** where it forms the lower surface of the knee joint. This area is critical for weight-bearing and knee stability. These fractures often result from high-impact trauma (e.g., car accidents, falls) or low-impact injuries in older individuals with osteoporosis. **Key Features:** **1.Location:** The fracture involves the **proximal (upper) tibia**, affecting the articular surface that connects with the femur (thighbone). **2.Mechanism:** Typically caused by axial loading (force along the bone) combined with varus or valgus stress (sideways bending of the knee). **3.Types:** **>Split (Cleavage) Fracture** – A vertical break, often from high-energy trauma. **>Depressed Fracture** – The joint surface is pushed downward, common in osteoporosis. **>Combination Fractures** – Both split and depression. **>Schatzker Classification** (I-VI) is commonly used to describe severity. **4.Symptoms:** >Severe knee pain & swelling >Difficulty bearing weight >Knee deformity (in severe cases) >Limited range of motion >Bruising around the knee **5.Diagnosis:** **>X-rays** (initial imaging) **>CT Scan** (for detailed fracture assessment) **>MRI** (to evaluate soft tissue damage—ligaments, meniscus) **6.Treatment:** **>Non-Surgical:** For non-displaced or stable fractures (bracing, immobilization, NWB for 6-8 weeks). **>Surgical:** For displaced or unstable fractures (ORIF—open reduction internal fixation with plates/screws, bone grafting for depressed fractures). **7.Complications:** **>Post-traumatic arthritis** (due to joint surface damage) **>Knee stiffness** **>Ligament/meniscus injuries** **>Compartment syndrome** (rare but serious) Early diagnosis and proper treatment are crucial to restore knee function and prevent long-term issues. Physical therapy is often needed for rehabilitation.
	EQIP-20	65.62	71.87
	GQS	5	5
	DISCERN	2	2

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q2	Answer	A tibial plateau fracture happens when there's enough force on the upper part of the shinbone (tibia) — right where it meets the knee joint — to break the bone. Common causes include: **1. High-energy trauma** (most common in younger people) >Car or motorcycle accidents >Falls from a height >Sports injuries with strong impact (skiing, football, basketball) **2.Low-energy trauma in weak bone** (common in older adults with osteoporosis) >A simple fall from standing height >Twisting the knee awkwardly Mechanically, it usually occurs because: -The **femur (thigh bone)** drives down into the **tibial plateau** with force. -The force can be vertical (compression) or angular (valgus/varus stress), sometimes with twisting. -This overloads the bone and can also damage **cartilage, meniscus, and ligaments**. If you want, I can also give you a **simple diagram showing how the force causes the fracture** so it's easier to visualize.	A **tibial plateau fracture** occurs when the upper part of the shinbone (tibia) near the knee is broken. This injury typically happens due to high-energy or low-impact forces, depending on bone strength. Common causes include: **1. High-Impact Trauma (Most Common)** **>Car accidents** – Direct force to the knee. **>Falls from height** – Landing on the feet or knees. **>Sports injuries** – Skiing, football, or basketball collisions. **>Motorcycle/bicycle crashes** – Direct knee impact. **2. Low-Impact Falls (Especially in Older Adults)** **>Osteoporosis** (weak bones) increases fracture risk even from minor slips or twists. **>Knee hyperextension or twisting** can crack the plateau in frail bones. **3. Pathological Causes (Less Common)** >Bone tumors or cysts weakening the tibial plateau. >Infections affecting bone integrity. **Mechanism of Injury** >The tibial plateau is vulnerable because it's a **weight-bearing surface**. >A **valgus (outward) or varus (inward)** force (e.g., a sideways hit to the knee) can split or depress the bone. **>Axial loading** (force along the leg, e.g., landing from a jump) can crush the plateau. **Who Is at Higher Risk?** **>Young adults** (due to high-energy trauma). **>Elderly individuals** (due to osteoporosis). **>Athletes** in contact sports or high-impact activities. Would you like details on symptoms or treatment options?
	EQIP-20	86.36	90.90
	GQS	4	5
	DISCERN	2	2

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q3	Answer	Yes, a tibial plateau fracture is generally considered a **serious fracture** because: **>It involves the knee joint** – The tibial plateau is the upper part of the tibia (shinbone) that supports the body's weight and forms part of the knee joint. Damage here can affect joint stability, alignment, and long-term function. **>Risk of joint surface damage** – The fracture can disrupt the smooth cartilage surface, leading to arthritis if not properly treated. **>Often linked to other injuries** – Ligament injuries, meniscus tears, or damage to surrounding soft tissues are common. **>Potential long recovery** – Healing often takes months, sometimes requiring surgery, and rehabilitation is critical to restore mobility and strength. In short, it's not just a "broken bone"—it's an **intra-articular fracture** (inside a joint) with high risk for long-term complications if not managed carefully. If you want, I can also explain **how doctors classify tibial plateau fractures and decide on treatment**, so you can better understand severity.	A **tibial plateau fracture** (a break in the upper part of the shin bone, where it meets the knee) can range from mild to very serious, depending on the severity, displacement, and associated soft tissue damage. Here's a breakdown: **Why It Can Be Serious:** **1.Weight-Bearing Joint** – The tibial plateau is critical for knee stability and movement. Damage can lead to long-term arthritis or instability if not treated properly. **2.Risk of Joint Damage** – If the fracture extends into the knee joint, it can disrupt cartilage, leading to early-onset osteoarthritis. **3.Soft Tissue Complications** – Often accompanied by meniscus tears, ligament injuries (ACL, PCL), or nerve/vascular damage. **4.Displaced Fractures** – Severe cases may require surgery (plates, screws, or even external fixation) to realign the bone. **5.Recovery Time** – Non-weight-bearing for weeks to months, with extensive rehab needed to restore knee function. **When It's Less Serious:** **>Non-displaced or hairline fractures** may heal with conservative treatment (brace, crutches, and physical therapy). **>Minimal joint involvement** has a better prognosis. **Potential Long-Term Issues:** -Chronic knee pain -Stiffness or limited range of motion -Post-traumatic arthritis -Risk of future knee replacements if severe **Bottom Line:** Yes, it can be a serious fracture, especially if displaced or involving the joint. **Early and proper treatment** (sometimes surgery) is crucial to avoid complications. If you or someone you know has this injury, consulting an **orthopedic surgeon** is highly recommended. Would you like details on treatment or recovery?
	EQIP-20	75.00	71.87
	GQS	4	4
	DISCERN	2	2

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q4	Answer	If you have a **tibial plateau fracture**, you generally **should not walk on it** until a doctor specifically clears you to do so. Here's why: >The tibial plateau is part of the knee joint and plays a critical role in **weight-bearing.** >Walking too soon can cause the fracture to **shift or collapse**, especially if it involves the **joint surface**. >This can lead to **permanent joint damage**, arthritis, or the need for more complex surgery later. **Typical recommendations:** **-Non-weight-bearing** for weeks to months (often 6–12 weeks) is standard, depending on fracture severity and treatment type. -You might use **crutches, a walker, or a brace** during recovery. -Gradual weight-bearing is usually introduced under the guidance of an orthopedic surgeon and physical therapist. If you're unsure whether your fracture is stable enough to walk on, it's safest to **assume "no" until confirmed by imaging and your doctor** — even a few unintended steps can cause harm. If you want, I can explain the **different types of tibial plateau fractures** and how the weight-bearing restrictions vary. That way you'll know the reasoning behind your own doctor's advice.	Walking on a **fractured tibial plateau** is generally **not recommended** without proper medical evaluation and clearance. The tibial plateau is a critical weight-bearing part of the knee, and putting pressure on it too soon can lead to complications such as: **>Worsening the fracture** (displacement or collapse) **>Delayed healing** or nonunion **>Arthritis development** due to joint surface damage **>Misalignment** leading to long-term knee dysfunction What You Should Do: **1.Seek Immediate Medical Attention** – Get an X-ray or CT scan to assess the severity of the fracture. **2.Follow Weight-Bearing Restrictions** – Depending on the fracture type (nondisplaced vs. displaced), your doctor may recommend: **>Non-weight-bearing (NWB)** – Using crutches or a walker. **>Partial weight-bearing (PWB)** – With a brace or assistive device. **>Full weight-bearing (FWB)** – Only if cleared by an orthopedic specialist. **3.Use a Knee Immobilizer or Brace** – If the fracture is stable, a brace may be prescribed to limit movement. **4.Consider Surgery if Needed** – Displaced or unstable fractures often require surgical fixation (plates, screws, or bone grafts). **5.Follow Physical Therapy** – Rehabilitation is crucial to restore knee strength and mobility. When Can You Walk Again? **-Non-displaced fractures:** May allow partial weight-bearing in 4-6 weeks. **-Displaced or surgically repaired fractures:** May require 6-12 weeks of restricted weight-bearing. **Do not attempt to walk without consulting an orthopedic doctor.** Improper loading can lead to permanent joint damage. If you suspect a tibial plateau fracture, see a specialist immediately. Would you like guidance on managing pain or mobility aids while healing?
	EQIP-20	93.75	93.75
	GQS	5	4
	DISCERN	4	4

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q5	Answer	Not always. Whether surgery is necessary for a tibial plateau fracture depends on several factors: **>Fracture displacement** – If the joint surface is displaced more than ~2–4 mm, or if there is significant step-off, surgery is usually recommended to restore joint congruency. **>Joint stability** – If the fracture causes ligament injury or instability in the knee, surgical fixation may be needed. **>Fracture type** – High-energy fractures (e.g., comminuted or bicondylar fractures) often require surgery, while minimally displaced fractures may be treated non-operatively. **>Patient factors** – Age, activity level, bone quality, and other health conditions influence the decision. **>Soft tissue condition** – Severe swelling or open wounds may delay or affect surgical timing. If the fracture is **non-displaced** and the knee is stable, many cases can be treated with **immobilization, limited weight-bearing, and physiotherapy** instead of surgery. If you'd like, I can prepare a **clear table** comparing when surgery is indicated vs *when conservative treatment is preferred* for tibial plateau fractures. Would you like me to do that?	The necessity of surgery in a **tibia plateau fracture** depends on several factors, including the **type of fracture, degree of displacement, joint stability, and patient-specific factors**. Here's a breakdown: **When Surgery is Typically Required:** **1.Displaced Fractures (>2-3 mm)** – If the fracture causes significant misalignment (especially involving the joint surface), surgery is often needed to restore alignment and prevent arthritis. **2.Depressed Fractures** – If the joint surface is sunken (depressed), surgery may be required to elevate and stabilize the bone. **3.Open Fractures** – Surgery is mandatory to clean the wound and stabilize the bone. **4.Associated Ligament or Meniscus Injuries** – If there is significant soft tissue damage, surgery may be needed for repair. **5.Unstable Joint** – If the knee is unstable (e.g., due to a split or comminuted fracture), surgery is usually recommended. **6.Bicondylar Fractures (both sides of the plateau affected)** – These often require surgical fixation. **When Non-Surgical Treatment May Be Considered:** **1.Non-displaced or Minimally Displaced Fractures (<2 mm)** – If the joint remains stable, conservative treatment (casting, bracing, non-weight-bearing) may suffice. **2.Low-Demand or Elderly Patients** – If the patient is not a good surgical candidate, non-operative management may be chosen despite some displacement. **3.Medical Contraindications** – Severe comorbidities (e.g., uncontrolled diabetes, vascular disease) may favor non-surgical approaches. **Key Considerations:** **>Long-term outcomes** depend on joint alignment and stability; poorly managed fractures can lead to post-traumatic arthritis. **>Early mobilization** (with surgery) often leads to better functional recovery than prolonged immobilization. **>CT/MRI scans** help assess the extent of joint involvement and guide treatment decisions. **Conclusion:** Surgery is **not absolutely necessary** for all tibial plateau fractures, but it is often recommended for displaced, unstable, or complex fractures to restore joint function and prevent complications. A **trauma or orthopedic surgeon** should evaluate imaging and patient factors to determine the best approach. Would you like details on specific surgical or non-surgical techniques?
	EQIP-20	90.62	90.62
	GQS	5	5
	DISCERN	2	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
			Yes, if you undergo surgery for a **tibial plateau fracture**, metal plates and screws are commonly used to stabilize the broken bone fragments and allow proper healing. The exact type of hardware depends on the fracture pattern and severity, but most surgeons use:
		Yes — if you have surgery for a tibial plateau fracture, the orthopedic surgeon will almost always use **metal implants** such as plates, screws, or a combination of both to stabilize the fracture and allow the bone to heal in the correct position.	**>Locking plates** (often made of titanium or stainless steel) **>Screws** (cortical or cancellous, sometimes headless) **>Pins or wires** (in some cases)
		About implant removal:	**Will the Hardware Need to Be Removed Later?**
		1.Often, they are left in permanently. If the metal does not cause pain, irritation, or interfere with joint function, it can stay in place for life.	In many cases, the plates and screws **can remain permanently** if they aren't causing issues. However, removal might be considered if:
		2.Removal is considered if:	**1.Pain or Irritation** – Some patients develop discomfort over the hardware, especially if it's near the skin.
Q6	**Answer**	>The metal causes discomfort (especially if it's close to the skin or soft tissue). >There's an infection involving the implant. >It interferes with future surgeries (e.g., a knee replacement). >In young, active patients, some surgeons remove them after full healing to prevent long-term irritation.	**2.Infection** – Rarely, if an infection occurs, removal may be necessary. **3.Younger Patients** – Surgeons sometimes recommend removal in younger, active individuals to avoid long-term bone stress changes. **4.Soft Tissue Issues** – If the hardware rubs against tendons or ligaments, removal may help.
		Typically, if removal is needed, it's done **at least 12 months after surgery**, once the fracture is fully healed.	**When Is Removal Typically Done?** -Usually **not before 12–18 months** post-surgery to ensure full healing. -Removal is a smaller surgery than the initial fixation but still requires recovery.
		If you'd like, I can also explain **which type of plate or screw is most commonly used for tibial plateau fractures** and why. That can help you picture what would be inside your knee after surgery.	Your surgeon will evaluate whether removal is needed based on X-rays, symptoms, and your activity level. Many people keep their hardware permanently without problems. Would you like details on recovery after surgery as well?
	EQIP-20	86.66	86.66
	GQS	5	5
	DISCERN	2	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q7	Answer	Pain after tibial plateau fracture surgery varies quite a lot from person to person, but there are some typical patterns: **>First 1–2 weeks** – Pain is usually most intense right after surgery, especially while swelling is high and the fracture is fresh. You'll likely need prescription pain medication during this time. **>Weeks 3–6** – Pain generally improves as swelling subsides and soft tissues start healing. You may still have discomfort when moving the knee or putting weight on it. **>Months 2–3** – Many people can transition to milder painkillers (or none) and only have soreness with physical therapy or increased activity. **>Months 4–6** – For most, pain is minimal by this stage, though stiffness, aching after activity, or weather-related discomfort can persist. **>Beyond 6 months** – A small number of patients still feel intermittent pain, especially if there's cartilage damage, post-traumatic arthritis, or hardware irritation. Full recovery in terms of pain and function can take **6–12 months**. If pain is persistent, worsening, or accompanied by swelling, warmth, or fever, it's important to see your surgeon to rule out infection, malalignment, or hardware issues. If you'd like, I can also outline the **factors that make pain last longer** after this surgery so you can know what to expect.	The duration of pain after **tibial plateau fracture surgery** varies depending on the severity of the injury, the type of surgery, and individual healing factors. However, here's a general timeline: **Typical Pain Duration:** **1. First 1–2 Weeks:** **>Sharp, acute pain** (managed with prescribed painkillers). >Swelling and inflammation peak in the first few days. **2. 2–6 Weeks:** >Pain gradually decreases but may persist with movement or physical therapy. >Dull, aching pain is common, especially after activity. **3. 6–12 Weeks:** >Most patients experience **significant improvement** in pain as bone and soft tissues heal. >Weight-bearing (if allowed) may cause temporary discomfort. **4. 3–6 Months:** >Residual stiffness or occasional soreness, especially with prolonged activity or weather changes. >Some patients may have mild discomfort for up to a year. **Factors Affecting Pain Duration:** **-Fracture severity** (Schatzker classification: higher grades=longer recovery). **-Surgical approac**h (open reduction vs. minimally invasive). **-Weight-bearing restrictions** (non-weight-bearing periods can delay muscle recovery, causing discomfort). **-Physical therapy compliance** (strengthening helps reduce pain long-term). **-Pre-existing conditions** (arthritis may prolong discomfort). **When to Seek Help:** -Pain **worsens** after initial improvement. -Signs of infection (redness, fever, unusual swelling). -Severe pain when bearing weight after clearance. Most patients see **major improvement by 3 months**, but full recovery can take **6–12 months**. If pain persists beyond expectations, consult your surgeon for further evaluation (e.g., hardware irritation, nonunion, or arthritis). Would you like guidance on pain management strategies?
	EQIP-20	80.00	93.33
	GQS	5	5
	DISCERN	2	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q8	Answer	After a tibial plateau fracture, the timing for **weight bearing** depends on several factors: **1. Severity and type of fracture** – Small, non-displaced fractures may allow earlier weight bearing (sometimes partial after a few weeks), while displaced or complex fractures — especially those involving surgery with plates/screws — typically require a longer non–weight bearing period. **2. Treatment approach –** **>Non-surgical treatment:** You might remain non–weight bearing for around 6–8 weeks before progressing to partial, then full weight bearing. **>Surgical fixation:** The typical range is 8–12 weeks of non–weight bearing, sometimes longer if bone healing is slow. **3.Bone healing rate and X-ray findings** – Your orthopedic surgeon will monitor healing through follow-up imaging and will only allow progression once the fracture is stable enough to tolerate load. **4.Your overall condition** – Age, bone quality, and other injuries can influence timing. **Typical timeline after surgery (example):** **>Weeks 0–8 (or 0–12):** Non–weight bearing, crutches/walker. **>Weeks 8–12:** Gradual partial weight bearing, usually starting at 25% of body weight and increasing weekly. **>After 12 weeks:** Progression to full weight bearing if X-rays confirm healing. **Important:** Starting weight bearing too early risks displacement, implant failure, or delayed healing. Your surgeon's instructions take priority, since they know your fracture pattern and fixation stability. If you want, I can also give you a **chart showing the recovery phases for tibial plateau fractures** so you can see where weight bearing fits in.	The timing for **weight-bearing after a tibial plateau fracture** depends on several factors, including: >Severity of the fracture (non-displaced vs. displaced, presence of soft tissue damage) >Type of treatment (non-surgical vs. surgical fixation) >Healing progress (seen on follow-up X-rays) >Surgeon's or physician's recommendation **General Weight-Bearing Guidelines** **1. Non-displaced Fractures (treated non-surgically)** **>Initial Period (Non-Weight-Bearing, NWB):** 4–6 weeks **>Partial Weight-Bearing (PWB):** 6–8 weeks (gradual increase) **>Full Weight-Bearing (FWB):** 8–12 weeks **2. Displaced Fractures (ORIF surgery)** **>Initial Period (Non-Weight-Bearing, NWB):** 6–8 weeks **>Partial Weight-Bearing (PWB):** 8–12 weeks (with crutches/walker) >**Full Weight-Bearing (FWB):** 12–16 weeks **3. Complex Fractures (with ligament/cartilage damage)** **>Initial Period (Non-Weight-Bearing, NWB):** 8–12 weeks **>Partial Weight-Bearing (PWB):** 12–16 weeks **>Full Weight-Bearing (FWB):** 16–20+ weeks **Key Considerations** **1.Non-Weight-Bearing (NWB):** >Typically lasts **6–8 weeks** post-injury/surgery. >You'll use crutches or a walker to avoid pressure on the leg. **2.Partial Weight-Bearing (PWB):** >Usually begins around **6–12 weeks**, depending on healing. >You may transition to **25–50%** weight-bearing with assistive devices. **3.Full Weight-Bearing (FWB):** >Most patients achieve FWB by **3–4 months**, but some complex cases take **6+ months**. >Physical therapy helps regain strength and mobility. **When Can You Walk Normally?** **-With crutches/walker:** After 6–8 weeks (PWB phase). **-Without support:** Typically 3–6 months, depending on recovery. **Follow-Up & Progression** **-X-rays at 6 weeks** determine if bone healing allows weight-bearing. **-Physical therapy** is crucial to restore knee function and prevent stiffness. **Always follow your surgeon's specific recommendations**, as individual cases vary. Would you like guidance on rehab exercises or pain management during recovery?
	EQIP-20	87.50	87.50
	GQS	5	5
	DISCERN	4	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q9	Answer	A tibial plateau fracture typically takes about **3 to 4 months** for the bone to heal enough for normal walking, but full recovery — including regaining strength, flexibility, and function — can take **6 to 12 months**. Healing time depends on: **1. Severity of the fracture** (simple vs. complex, displaced vs. non-displaced) **2. Type of treatment** (surgical fixation vs. non-surgical) **3. Age and general health** **4. How closely you follow weight-bearing restrictions** **5. Physical therapy progress** **Typical timeline:** **>0–6 weeks:** Usually no weight on the leg, knee protected in a brace or cast. **>6–12 weeks:** Gradual weight-bearing if X-rays show healing. **>3–6 months:** Walking without assistance in many cases. **>6–12 months:** Return to high-impact activities, sports, or heavy work (if recovery is smooth). If you'd like, I can also give you a **recovery timeline chart** showing bone healing, rehab milestones, and expected pain improvement week by week. Would you like me to prepare that?	The healing time for a **tibial plateau fracture** depends on several factors, including the severity of the fracture, the treatment method (non-surgical vs. surgical), the patient's age, overall health, and adherence to rehabilitation. Here's a general timeline: **Healing Phases & Recovery Timeline** **1. Initial Healing (Bone Union)** **>Non-displaced/minor fractures (treated non-surgically): 6–8 week**s for initial bone healing (with a brace or cast). **>Displaced/complex fractures (requiring surgery): 8–12 weeks** for the bone to heal sufficiently (may involve plates/screws). **2. Weight-Bearing Progression** **>Non-weight-bearing (NWB):** Typically **6–8 weeks** post-injury/surgery. **>Partial weight-bearing (PWB):** Gradual progression starting around **8–12 weeks**. **>Full weight-bearing (FWB):** Often by **12–16 weeks**, depending on healing progress. **3. Full Recovery & Rehabilitation** **>Physical therapy** begins early (range-of-motion exercises) and continues for **3–6 months**. **>Return to normal activities:** Light activities: **3–4 months**. Sports/high-impact activities: **6–12 months** (if cleared by a doctor). **Factors Affecting Healing Time** **-Severity:** Type II–VI (Schatzker classification) fractures take longer. **-Age:** Younger patients heal faster. **-Comorbidities:** Diabetes, smoking, or osteoporosis can delay healing. **-Complications:** Infections, poor alignment, or arthritis may prolong recovery . **When to Expect Full Healing?** Most patients achieve **functional recovery by 6 months**, but complete healing (bone remodeling) can take **up to a year**. Follow-up X-rays and doctor evaluations are crucial to monitor progress. Would you like details on rehabilitation exercises or potential complications?
	EQIP-20	87.50	87.50
	GQS	5	5
	DISCERN	3	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q10	Answer	Most people are able to walk normally again after a tibial plateau fracture, but the outcome depends on several factors: **>Severity and type of fracture** – Simple, well-aligned fractures tend to heal with better function than complex fractures involving multiple fragments or joint surface depression. **>Treatment quality** – Whether you had surgery (plates/screws) or non-surgical care, proper alignment and stable fixation help protect the knee's cartilage and ligaments during healing. **>Rehabilitation** – A structured physiotherapy program to restore range of motion, strength, and balance is crucial for regaining a normal gait. **>Joint damage** – If the fracture caused cartilage injury or post-traumatic arthritis develops, some stiffness, limp, or pain with activity may persist. **>Time** – Bone healing usually takes about 3–6 months, but walking without any noticeable limp may take longer—often 6–12 months depending on your progress. In many cases, especially with good fracture reduction and diligent rehab, patients can return to normal walking and even sports, though high-impact activities may carry a higher arthritis risk later in life. If you want, I can give you a **timeline of what walking recovery usually looks like after a tibial plateau fracture** so you can picture the process.	Yes, most people are able to walk normally again after a **tibial plateau fracture**, but recovery depends on several factors, including: **1. Severity of the Fracture** **>Non-displaced or mild fractures** (Schatzker I-III) often heal well with conservative treatment (e.g., bracing, limited weight-bearing). **>Displaced or complex fractures** (Schatzker IV-VI) may require surgery (plates, screws, or external fixation) and have a longer recovery. **2. Quality of Rehabilitation** **>Physical therapy (PT)** is crucial to restore strength, mobility, and gait. >Early movement (if allowed) helps prevent stiffness, while progressive weight-bearing rebuilds muscle and joint function. **3. Possible Complications** **>Post-traumatic arthritis** (if cartilage was damaged). **>Knee stiffness or instability** (if ligaments were affected). **>Muscle weakness or limping** (if rehab is inadequate). **Typical Recovery Timeline** **-6–12 weeks:** Limited weight-bearing, then gradual increase. **-3–6 months:** Most regain near-normal walking. **-6–12+ months:** Full strength and endurance may take longer, especially for high-impact activities. **Will You Walk Normally?** **-Most patients** regain a normal or near-normal gait with proper treatment and rehab. **-Some** may have mild stiffness or discomfort, especially in cold weather or after long activity. **-Severe cases** might have lingering issues, but assistive devices (braces, orthotics) can help. **Key to Success:** -Follow your doctor's weight-bearing instructions. -Commit to physical therapy. -Strengthen quadriceps, hamstrings, and calves. -Monitor for persistent pain/swelling (may need further intervention). Would you like guidance on specific rehab exercises or pain management strategies? Let me know how your recovery is progressing!
	EQIP-20	85.71	85.71
	GQS	5	5
	DISCERN	2	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q11	Answer	After a tibial plateau fracture, you will usually need crutches or a walker for **about 6 to 12 weeks**, depending on: **>Severity and type of fracture** (non-displaced vs. displaced, number of fracture lines, depression of the joint surface) **>Treatment method** (surgery vs. non-surgical) **>Bone healing rate** (varies by age, bone health, and other medical conditions) **>Surgeon's weight-bearing protocol** (some allow partial weight bearing earlier; others require complete non-weight bearing until follow-up X-rays show enough healing) **Typical timeline:** **1. First 6–8 weeks – Non-weight bearing:** You use crutches or a walker to keep weight entirely off the injured leg. **2. Weeks 8–12 – Partial weight bearing:** You may begin putting some weight on the leg, gradually increasing based on X-ray results and your surgeon's guidance. **3. After 12 weeks – Full weight bearing:** Often possible if healing is good and your knee is stable. You may still use a cane for balance. Physical therapy usually starts early for range of motion, but weight-bearing is introduced only when the bone is strong enough. If you'd like, I can make you a **clear recovery timeline chart** for tibial plateau fractures so you can see each phase visually.	The duration of crutch or walker use after a **tibial plateau fracture** depends on several factors, including: **>Severity of the fracture** (non-displaced vs. displaced, surgical vs. non-surgical) **>Weight-bearing restrictions** (non-weight-bearing, partial weight-bearing, or full weight-bearing) **>Healing progress** (bone union and soft tissue recovery) **>Rehabilitation progress** (strength, balance, and mobility) **General Timeline for Crutch/Walker Use** **1. Non-Surgical Treatment** (for stable, non-displaced fractures): **>Non-weight-bearing (NWB) for 6–8 weeks** (crutches/walker required). >Transition to **partial weight-bearing (PWB)** at 6–8 weeks, possibly still using crutches or a walker. **>Full weight-bearing (FWB)** typically by 1**0–12 weeks**, with gradual weaning off assistive devices. **2. Surgical Treatment** (for displaced or unstable fractures): **>Non-weight-bearing for 6–12 weeks** (longer if bone healing is delayed). **>Partial weight-bearing around 8–12 weeks**, depending on healing (X-ray confirmation needed). **>Full weight-bearing often by 12–16 weeks**, but some may need crutches longer if weakness or pain persists. **When Can You Stop Using Crutches/Walker?** >You'll typically transition off assistive devices once: -Your surgeon confirms adequate bone healing. -You can walk without significant pain or limping. -You regain sufficient quadriceps and hip strength (physical therapy helps). **Key Considerations:** **>Delayed healing?** Smokers, diabetics, or those with osteoporosis may need longer. **>Physical therapy** is crucial to regain strength and mobility before ditching crutches. **>Listen to your body**—some people need crutches longer if balance or pain is an issue. Would you like guidance on rehab exercises or signs of proper healing? Let me know your specific case details for a more tailored estimate!
	EQIP-20	86.66	93.33
	GQS	4	5
	DISCERN	3	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q12	Answer	Yes — after a tibial plateau fracture, physical therapy is almost always needed. The main goals are to: **>Restore knee motion** (both bending and straightening) **>Regain strength** in the quadriceps, hamstrings, and hip muscles **>Improve balance and walking ability** **>Reduce stiffness and swelling** When therapy starts and how intense it is will depend on: -Whether you had **surgery or non-surgical treatment** -How stable the fracture is and when your surgeon allows **weight-bearing** -Your **age, fitness level, and overall health** In many cases: **>Early stage (0–6 weeks):** Gentle range-of-motion and isometric muscle exercises (often while still using crutches) **>Later stage (6–12+ weeks):** Gradual weight-bearing, strengthening, and functional training **>Full recovery:** May take several months to a year, with ongoing home exercises If you'd like, I can outline a **typical week-by-week rehab plan** after a tibial plateau fracture so you know what to expect.	Yes, **physical therapy (PT)** is typically a crucial part of recovery after a **tibial plateau fracture**. The extent and duration of therapy depend on the severity of the fracture, the type of treatment (surgical vs. non-surgical), and your overall health, but here's why PT is usually necessary: **Why Physical Therapy is Important:** **1. Restoring Range of Motion (ROM):** After immobilization (casting, bracing, or surgery), the knee often becomes stiff. PT helps regain flexibility. **2. Strengthening Muscles:**The quadriceps, hamstrings, and calf muscles weaken due to reduced use. PT rebuilds strength to support the knee. **3. Improving Weight-Bearing Tolerance:** If you were non-weight-bearing for weeks, PT helps gradually reintroduce walking and balance. **4. Reducing Swelling & Pain:** Manual therapy, ice, compression, and exercises can help manage post-injury swelling. **5. Preventing Long-Term Complications:** Without PT, you may develop chronic stiffness, instability, or arthritis risk due to improper movement patterns. **When Does PT Start?** **>Non-Surgical Cases:** PT may begin once the bone is stable (usually after 4-6 weeks in a brace). **>Post-Surgical Cases:** PT often starts within days to weeks after surgery, depending on the surgeon's protocol. **What to Expect in PT:** **>Early Phase:** Gentle movements, edema control, and isometric strengthening. **>Mid-Phase:** Progressive weight-bearing, balance exercises, and resistance training. **>Late Phase:** Functional training (stairs, squats) and sport-specific drills if needed. **How Long Will You Need PT?** >Typically **3–6 months**, but severe fractures may require longer rehab. >Full recovery can take **6–12 months**, depending on complications (e.g., arthritis, ligament damage). **Will You Definitely Need PT?** In almost all cases, **yes**—especially if you had surgery or prolonged immobilization. Even mild fractures benefit from guided rehab to prevent stiffness or weakness. Would you like help understanding specific exercises or precautions based on your fracture type?
	EQIP-20	80.00	86.66
	GQS	4	5
	DISCERN	3	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q13	Answer	The time you can return to work after a tibial plateau fracture depends on several factors: **>Type of work** – physically demanding jobs (construction, nursing, factory work) require longer recovery than desk-based work. **>Severity of the fracture** – simple, non-displaced fractures heal faster than complex ones requiring surgery and plates/screws. **>Treatment method** – surgery generally means a longer initial recovery than conservative (cast/brace) treatment. **>Your progress in rehabilitation** – pain control, knee range of motion, muscle strength, and ability to bear weight are key milestones. **Typical timelines:** **-Sedentary/desk work:** often 6–8 weeks after injury (sometimes sooner if swelling and pain are controlled and you can sit comfortably). **-Light-duty work (standing, walking but no heavy lifting):** 3–4 months. **-Physically demanding work (lifting, climbing, squatting):** 4–6 months or longer, especially if surgery was done. **-High-impact/manual labor:** up to 9–12 months in severe cases. Even if you feel ready earlier, your orthopedic surgeon will usually wait until X-rays show **solid bone healing** and your physical therapist confirms safe knee function before clearing you. If you'd like, I can make you a **timeline chart** for return-to-work based on injury severity and job type so you can compare scenarios. Would you like me to do that?	The time it takes to return to work after a **tibial plateau fracture** depends on several factors, including: **>Severity of the fracture** (non-displaced vs. displaced, surgical vs. non-surgical) **>Type of treatment** (casting, bracing, ORIF surgery) **>Your job demands** (sedentary vs. physically demanding) **>Your healing progress** (bone union, muscle strength, mobility) **General Timeline for Return to Work:** **1. Sedentary/Desk Job (Low Physical Demand):** **>Non-surgical treatment (brace/cast):** 4–8 weeks (may return earlier with crutches/walker if able to elevate the leg). **>Surgical treatment (ORIF):** 2–6 weeks (depending on pain and swelling control, possibly with crutches). **2. Light-Duty Job (Some Standing/Walking):** Typically **6–12 weeks**, depending on weight-bearing status (may require a knee brace or crutches). **3. Physically Demanding Job (Heavy Lifting, Climbing, Manual Labor):** Usually **3–6 months** (must regain full strength, mobility, and medical clearance). **Key Milestones Before Returning to Work:** **-Weight-bearing status:** Your doctor will progress you from non-weight-bearing (NWB) → partial (PWB) → full weight-bearing (FWB). **-Pain & swelling control:** Should be manageable with activity. **-Range of motion (ROM):** Knee bending (flexion) and straightening (extension) should be functional. **-Strength:** Physical therapy helps restore quadriceps and hamstring strength. **When to Check with Your Doctor:** -If your job requires prolonged standing, walking, or lifting. -If you still have significant pain, instability, or swelling. -If you're unsure about your weight-bearing restrictions. Would you like guidance on speeding up recovery or modifying work duties? Let me know your job type and treatment details for a more tailored estimate!
	EQIP-20	87.50	81.25
	GQS	5	5
	DISCERN	3	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q14	Answer	Yes — but it depends on several factors, and the path back to sports is often gradual. **Key factors that influence your ability to return to sports after a tibial plateau fracture:** **1. Fracture severity and type** >Simple, non-displaced fractures heal faster and have better long-term outcomes. >Complex fractures involving joint surface damage or multiple fragments can affect stability and alignment. **2. Surgical vs. non-surgical treatment** >If surgery was required, recovery time can be longer, especially if hardware (plates, screws) crosses the joint surface. >Proper joint surface restoration is critical for performance in high-impact sports. **3. Joint health after healing** >Full recovery depends on restoring **range of motion, muscle strength**, and **joint stability**. >Any residual stiffness, weakness, or ligament injury can limit performance. **4. Risk of post-traumatic arthritis** >Damage to the cartilage increases the risk of arthritis, which can affect high-impact activities over time. **Typical return-to-sport timelines (for uncomplicated cases):** **-Low-impact activities** (cycling, swimming): often possible around **3–6 months**. **-Running, jumping, pivoting sports** (soccer, basketball, skiing): may require **9–12 months** or longer, depending on recovery progress. **Bottom line:** Many people can return to sports after a tibial plateau fracture, but the level and type of sport might need adjustment. Full, high-impact return is more likely in younger patients with less severe fractures and excellent rehab compliance. If you want, I can give you a **sport-specific recovery timeline** for common activities after this type of fracture. That would give you a clearer idea of expectations.	The ability to return to sports after a **tibial plateau fracture** depends on several factors, including the **severity of the fracture**, the t**ype of treatmen**t (surgical vs. non-surgical), **rehabilitation progress**, and the **specific sport** you want to resume. Here's a general outlook: **1. Factors Affecting Return to Sports** **>Fracture Type:** **-Non-displaced/minor fractures** (Schatzker I-III) often heal well with conservative treatment, allowing a quicker return. **-Displaced/complex fractures** (Schatzker IV-VI) usually require surgery and have a longer recovery. **>Surgical Repair:** If plates/screws were used, full healing must occur before high-impact activity. **>Rehabilitation:** Proper **PT (physical therapy)** is crucial to restore strength, mobility, and balance. **>Joint Stability & Cartilage Damage:** If the knee joint was significantly damaged, arthritis or instability could limit sports performance. **>Sport Demands:** -Low-impact sports (swimming, cycling) → earlier return (~3-6 months). -High-impact/pivoting sports (soccer, basketball, skiing) → longer recovery (6-12+ months). **2. Typical Recovery Timeline** **>Non-Surgical Cases:** -6-12 weeks in a brace or cast. -Weight-bearing gradually increases. -Return to light sports in **4-6 months** if healed well. **>Surgical Cases:** -6-8 weeks non-weight-bearing. -Full weight-bearing by **3-4 months**. -Return to sports often **6-12 months** post-op, depending on healing. **3. Long-Term Considerations** **>Risk of Post-Traumatic Arthritis:** Severe fractures increase this risk, potentially affecting long-term sports participation. **>Muscle Atrophy & Stiffness:** Aggressive rehab helps, but some athletes may not regain 100% pre-injury performance. **>Sport Modifications:** Some may need to switch to lower-impact activities if pain or instability persists. **4. When Can You Return?** **>Medical Clearance is Essential** (X-rays/MRI may be needed to confirm healing). **>Functional Tests:** Your doctor/PT will assess strength, range of motion, and agility before clearing you. **Bottom Line** Many athletes **do return to sports** after a tibial plateau fracture, but the timeline and performance level vary. **Low-impact sports may resume within 6 months, while high-impact sports often take 9-12+ months**. Work closely with your orthopedic surgeon and physical therapist for the best outcome. Would you like guidance on specific rehab exercises or sports? Let me know your situation!
	EQIP-20	75.00	87.50
	GQS	4	5
	DISCERN	3	3

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Table 2. AI-generated responses to frequently asked questions and their corresponding EQIP-20, GQS, and Modified DISCERN scores

Question	Item	ChatGPT	DeepSeek
Q15	Answer	Tibial plateau fractures can have a range of complications, which may be **early** (acute) or **late** (long-term). Here's a structured overview: **1. Early Complications** These occur in the first days to weeks after the injury or surgery. **>Compartment syndrome** Increased pressure in the leg compartments can cause pain, sensory changes, muscle weakness, and if untreated, permanent damage. **>Neurovascular injury** Damage to the **popliteal artery, peroneal nerve**, or other nearby structures may occur at the time of injury or during surgery. **>Infection** -More common after open fractures or surgical fixation. -Can be superficial (wound) or deep (osteomyelitis). **>Deep vein thrombosis (DVT) / Pulmonary embolism (PE)** Due to immobility and trauma. **>Wound healing problems / skin necrosis** Especially in cases with severe soft-tissue injury or high-energy trauma. **2. Intermediate Complications** These appear weeks to months after injury. **>Loss of reduction / fixation failure** Bone fragments may shift, especially if early weight-bearing occurs. **>Knee stiffness** Scar tissue and prolonged immobilization can limit range of motion. **>Malunion or nonunion** Bone heals in a wrong position or fails to heal, affecting knee alignment. **>Persistent pain** From soft tissue damage, hardware irritation, or joint incongruity. **3. Late Complications** These occur months to years later. **>Post-traumatic osteoarthritis** Damage to the articular cartilage or imperfect joint surface restoration leads to degenerative changes. **>Chronic instability** If ligament injuries (ACL, MCL, LCL, PCL) are missed or inadequately treated. **>Hardware-related problems** Pain, prominence under the skin, or mechanical irritation may require hardware removal. **>Chronic regional pain syndrome (CRPS)** A rare but disabling pain condition following trauma. If you want, I can also prepare a **table** summarizing these complications by **timing, mechanism, and prevention strategies**, which is something often used in orthopedic reference materials. This could make it easier to remember and use clinically.	A **tibial plateau fracture** (a break in the upper part of the shin bone at the knee joint) can lead to several complications, which may be **early** (acute) or **late** (chronic). Here are the key potential complications: **Early Complications** **1.Compartment Syndrome:** Increased pressure within the leg muscles, leading to ischemia and nerve damage if not treated urgently. **2.Neurovascular Injury:** Damage to the **popliteal artery, peroneal nerve**, or **tibial nerve** due to fracture displacement or trauma. **3.Deep Vein Thrombosis (DVT) & Pulmonary Embolism (PE):** Immobilization increases the risk of blood clots. **4.Soft Tissue Damage & Wound Complications:** Open fractures or surgical incisions may lead to infection or delayed wound healing. **5.Knee Effusion & Hemarthrosis:** Blood accumulation in the joint, causing pain and stiffness. **Late Complications** **6.Post-Traumatic Osteoarthritis:** Cartilage damage at the time of injury can lead to early degenerative joint changes. **7.Knee Stiffness & Reduced Range of Motion (ROM):** Due to prolonged immobilization, scarring, or intra-articular adhesions. **8.Malunion or Nonunion:** Improper bone healing (malalignment) or failure to heal (nonunion), leading to deformity or instability. **9.Persistent Instability or Ligamentous Laxity:** Associated ligament injuries (e.g., ACL, MCL) may cause chronic knee instability. **10.Chronic Pain & Functional Impairment:** Due to joint incongruity, nerve injury, or muscle weakness. **11.Complex Regional Pain Syndrome (CRPS):** A rare but severe pain disorder following trauma. **Risk Factors for Complications** -High-energy trauma (e.g., car accidents) -Open fractures -Comminuted (shattered) fractures -Delayed treatment -Poor surgical reduction **Prevention & Management** -Early surgical fixation (if needed) -Proper rehabilitation (physical therapy) -DVT prophylaxis (blood thinners, compression devices) -Monitoring for compartment syndrome Would you like details on treatment options or rehabilitation strategies?
	EQIP-20	75.00	87.50
	GQS	4	5
	DISCERN	2	3

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Table 3. Total quality scores (EQIP-20 and GQS) of ChatGPT-5 and DeepSeek models

Assessment	Model	Median	IQR	Minimum	Maximum	p-value*
EQIP-20	**ChatGPT-5**	80.00	11.2	62.5	93.8	0.006
	DeepSeek	87.50	4.58	71.9	93.8	
GQS	**ChatGPT-5**	4.00	0.00	4.0	5.0	0.001
	DeepSeek	5.00	0.00	4.0	5.0	

*IQR: Interquartile Range, Wilcoxon signed-rank test

Table 4. Reliability assessment (DISCERN scores) of ChatGPT-5 and DeepSeek models

Model	Median	IQR	Minimum	Maximum	p-value*
ChatGPT-5	3.0	1.0	2	4	0.041
DeepSeek	3.0	0.0	2	4	

*IQR: Interquartile Range, Wilcoxon signed-rank test

Table 5. Comparison of readability metrics between ChatGPT-5 and DeepSeek models

Readability metric	ChatGPT-5 (Mean ± SD)	DeepSeek (Mean ± SD)	p-value*
ARLC	11.04 ± 1.68	10.89 ± 1.28	0.751
ARI	11.94 ± 2.06	11.26 ± 1.45	0.285
FRES	50.93 ± 10.46	47.33 ± 8.23	0.209
Gunning fog index	11.0 ± 1.54	11.66 ± 1.56	0.154
FKGL	10.2 ± 2.29	9.34 ± 1.39	0.142
Coleman–liau index	12.39 ± 1.57	13.55 ± 1.39	0.030
SMog index	9.55 ± 1.59	8.69 ± 1.24	0.041
OLW	69.67 ± 8.33	74.93 ± 7.86	0.041
LWG	12.29 ± 3.54	8.18 ± 2.20	0.001

*IQR: Interquartile Range, Wilcoxon signed-rank test

Discussion

In this study, the responses of ChatGPT-5 and DeepSeek to 15 FAQs related to tibial plateau fractures were compared in terms of quality, reliability, and readability. Using 12 different evaluation methods, the strengths and weaknesses of both models were statistically analyzed. Overall, both AI applications were found to provide generally satisfactory answers. However, according to GQS and EQIP-20 scores, which were used for quality assessment, DeepSeek achieved higher values than ChatGPT-5 in terms of overall informational value and coherence of presentation. For reliability, the Modified DISCERN Scale showed that although both models had the same median score, DeepSeek's responses were more consistent, while ChatGPT-5's responses displayed greater variability, producing both higher and lower reliability scores in different instances. Regarding readability metrics, overall similarities were observed; however, DeepSeek yielded higher scores in the Coleman–Liau Index (which estimates the educational level required for comprehension based on word and sentence length) and OLW (which reflects the overall "linguistic weight" of a text by considering word length, sentence length, and lexical density). Elevated values in these indices may reduce readability in patient education materials, particularly for individuals with low health literacy. In contrast, ChatGPT-5 scored higher in LWG, which measures the frequency of long words in the text. Although a high LWG may potentially enhance technical accuracy, it can also adversely affect readability in patient-centered content.

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Several studies in the literature have examined the evaluation of patient FAQs using AI models. In a comparative study evaluating patient-oriented frequently asked questions related to robotic-assisted total knee arthroplasty, ChatGPT and Google were assessed in terms of response quality, clinical relevance, and readability. The authors reported that although AI-based tools were generally capable of providing accurate and readable information, substantial variability remained in clinical applicability and consistency of responses [13]. This study underscores the importance of evaluating AI-generated content not only for accuracy but also for reliability and practical usefulness within specific orthopedic contexts.

Zhang et al. selected 10 FAQs regarding total knee arthroplasty and directed them to ChatGPT-4, evaluating accuracy on a 5-point scale. Five of the questions received full scores, and the authors concluded that the model performed successfully [10]. White et al. conducted a study on boxer's fractures, a common presentation in emergency departments, in which they posed 10 FAQs to ChatGPT-4. The responses were assessed for clarity, and the model's overall performance was rated as good [8]. In another study, White et al. directed 15 FAQs about shoulder arthroplasty to GPT-4, evaluating responses for accuracy and again reporting good performance [19]. Lieu et al. examined FAQs about scoliosis, reporting that ChatGPT-5's answers were satisfactory [20]. A more comprehensive study by Ozduran et al. identified 25 FAQs related to pain, posed them to ChatGPT-5, Gemini, and Perplexity AI, and evaluated the responses for reliability, readability, and quality. All three models were found to perform well overall [11]. Similarly, in our study, 15 FAQs about tibial plateau fractures were posed to both ChatGPT-5 and DeepSeek. The responses were evaluated in three categories, following a similar methodology to Ozduran et al., and both models were shown to provide overall successful results. At the time of our study, ChatGPT-5 had been released; therefore, it was selected with the expectation of representing the most advanced version of AI available. DeepSeek was included due to its free accessibility and ease of use.

In Ozduran et al.'s pain study, ChatGPT obtained the lowest scores in GQS, while Gemini achieved the highest. In terms of EQIP, ChatGPT again had the lowest scores, whereas Perplexity performed best [11]. Similarly, in our study, ChatGPT-5 scored lower than DeepSeek in both GQS and EQIP. For reliability, Ozduran et al. found that Perplexity achieved the highest scores on the Modified DISCERN Scale, while ChatGPT had the lowest. In the scoliosis study, ChatGPT's responses were reported to demonstrate moderate consistency on the DISCERN scale [20]. In parallel, our findings also revealed that ChatGPT-5 produced less reliable responses compared to DeepSeek. Possible explanations for ChatGPT-5's lower quality and reliability scores include its tendency to provide general, less detailed answers; present information in a definitive manner that may appear self-sufficient; and address topics with less systematic organization (fewer subheadings) compared to other AI applications. Conversely, alternative models were more likely to direct patients to seek medical consultation and to structure their responses in a more detailed manner.

Regarding readability, Ozduran et al. reported that ChatGPT's responses were generally at a high school to university level, indicating a difficult readability level [11]. Similarly, in the scoliosis study by Lieu et al., ChatGPT's responses were found to be at the high school to university level [20]. In line with these findings, our study also demonstrated that both ChatGPT-5 and DeepSeek generated responses requiring high school to university level comprehension across all readability metrics. Ultimately, both AI applications were found to generate content above the recommended sixth-grade level for patient education, limiting accessibility for the general patient population and underscoring the continued need for human physician oversight.

This study has several strengths. It is the first to assess ChatGPT-5 and DeepSeek specifically in the clinically complex context of tibial plateau fractures. The use of a standardized and reproducible evaluation protocol, including separate chat sessions and multiple validated assessment instruments, enhances methodological rigor. Additionally, the FAQ set was derived from real patient inquiries and structured web-based searches, increasing the clinical relevance and external validity of the findings. Future applications could benefit from integrating AI-generated content with clinician-validated summaries or fine-tuning large language models to better approximate lay language, thereby improving patient comprehension and reducing the risk of misinformation.

This study has certain limitations. First, the analysis focused exclusively on tibial plateau fractures, limiting the generalizability of the findings to other orthopedic conditions. Second, the AI models examined were specific versions, and given their dynamic nature, outputs may vary across different time points. Third, the measures of readability and quality utilized in this study primarily assessed linguistic and structural characteristics, without directly incorporating patient perspectives, clinical accuracy, or real-world comprehensibility. Furthermore, readability indices are based on U.S. grade-level education systems, which may limit the generalizability of the reported reading-level scores to other populations. In addition, the study did not include multimodal (image-based) or multilingual AI models, which are becoming increasingly relevant in orthopedic patient education; this limits the scope of comparison and the generalizability of our findings. Finally, the study was conducted using only English-language responses, representing a limitation in terms of linguistic diversity.

Conclusion

In conclusion, our findings suggest that both ChatGPT-5 and DeepSeek generated responses that were largely successful in terms of quality and reliability; however, certain limitations were identified, including lack of referencing, occasional inaccuracies, and content complexity exceeding patients' comprehension levels. While AI applications hold promise as complementary

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tools for patient education in specific orthopedic conditions such as tibial plateau fractures, greater efforts are required to enhance readability and ensure clinical oversight before integration into patient care pathways.

Ethical Approval
Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

Conflict of Interest
The authors declare no conflict of interest.

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