Stinchfield Resisted Hip Flexion Test

Contributing Author: *Brian J. McGrory, MD*

Series Editors: *Saeed A. Syed, MD, MRCP, and Asif Saberi, MD*

The Stinchfield test, a pain response caused by an increase in hip joint reactive force, is a valuable test that distinguishes between intra-articular and extra-articular hip pathology causing groin, thigh, buttock, and even pretibial leg pain. Positive pain response to the Stinchfield test (**Sidebar**) is a simple way to confirm intra-articular pathology and is a marker of such disorders as arthritis, synovitis, occult femoral neck fracture, and prosthetic failure or loosening. The Stinchfield test requires no special equipment, offers significant diagnostic yield, and may be performed in both the office and emergency department settings.

HISTORIC PERSPECTIVE

According to *A Tribute to Frank Stinchfield, MD*,[1] Frank Edward Stinchfield was born in Warren, MN, in 1910. He received a BS in medicine in 1932 from the University of North Dakota (Grand Forks, ND) after transferring from Carleton College (Northfield, MN), and received his MD in 1934 from Northwestern Medical School (Chicago, IL). Stinchfield studied hip, shoulder, and joint replacement techniques in both the United States and Europe. After a meritorious World War II military career, Stinchfield returned to the United States where he began his attendance and associate professorship at New York Orthopaedic Hospital (New York, NY).

Stinchfield was a renowned clinician and teacher. Throughout his career, he acted as Professor and Chairman of the Department of Orthopaedic Surgery and Director of the New York Orthopaedic Hospital (New York, NY), President of the American Academy of Orthopaedic Surgeons (Rosemont, IL), President of the American Board of Orthopaedic Surgery (Chapel Hill, NC), and founder and President of both the Hip Society, USA (Belmont, CA), and International Hip Society.

Stinchfield introduced Sir John Charnley's (English orthopaedic surgeon, 1911–1980) hip replacement technique to the New York Orthopaedic Hospital in 1968, thereby establishing the Columbia University-affiliated hospital as one of the few sites in the United States that performed the operation at that time. Before he retired, Stinchfield published almost 100 articles, primarily on hip replacement and arthroplasty. Stinchfield died on December 1, 1992.

The simple resisted hip flexion test presented in this article has been called the *Stinchfield test*; the test has been taught at the Mayo Clinic for years.[2] The origin of the Stinchfield test is not known, but can possibly be explained by Stinchfield's time spent working with illustrious American surgeons Charles and William Mayo (1865–1939 and 1861–1939, respectively).[1]

STINCHFIELD RESISTED HIP FLEXION TEST

Definition: Reproduction of pain in a typical pattern related to the sensory innervation of the hip (groin, thigh, buttock, or knee) with resisted active flexion of the hip.

Elicitation: From a supine position with the knee extended, the patient is asked to actively elevate the leg while gentle manual resistance is added by the examiner (**Figure 1**).

Normal response: The patient experiences no pain and can use full strength to elevate the leg.

Positive response: Reproduction of pain in a typical pattern related to the sensory innervation of the hip (groin, thigh, buttock, or knee), sometimes associated with yielding weakness.

CLINICAL PRESENTATION

A patient who presents with pelvic, back, or leg pain often attributes the symptom or symptoms to the "hip."

Dr. McGrory is Co-Director, Maine Joint Replacement Institute, Portland, ME, and Clinical Associate Professor, Department of Surgery, University of Vermont, Burlington, VT. Drs. Syed and Saberi are Clinical Instructors, Department of Medicine, State University of New York at Buffalo, Buffalo, NY, and Staff Physicians, The Resource Center, Diagnostic and Treatment Outpatient Clinic, Dunkirk, NY.

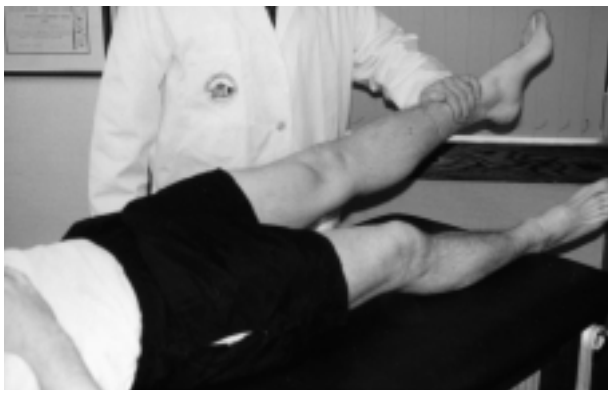

Figure 1. A patient actively elevates his leg while the physician places gentle manual resistance. If intra-articular hip pathology is present, pain in a distribution consistent with hip irritation will be noted. The referral pattern of hip pain occurs through radiation to the portions of sensory distribution of the femoral, obturator, and sciatic nerves.

The referral pattern of hip pain has been recently summarized by Kahn and Woolson[3] to occur through radiation to portions of the sensory distribution of the femoral, obturator, and sciatic nerves. A positive Stinchfield test demonstrates increasing intra-articular pressure that causes pain in the distribution of the hip's sensory innervation. Pain in the low back and sacroiliac joint area is not a positive response because hip joint discomfort does not radiate to these areas.

PHYSIOLOGY

While in the supine position, the patient is asked to actively elevate her or his leg a few inches. The muscle groups that cross the hip joint contract, and the hip joint reactive force (ie, the force produced by the impact between the femoral head and the acetabulum) is elevated. If gravitational resistance on the leg does not elicit discomfort, the physician adds gentle manual resistance (Figure 1).

The elevation in joint reactive force causes near isolation of the hip joint from extra-articular structures that commonly cause pain. If intra-articular pathology is present, pain in a distribution consistent with hip irritation (**Table 1**) will be noted.[3] As previously discussed, the referral pattern of hip pain occurs through radiation to portions of the sensory distribution of the femoral, obturator, and sciatic nerves.

Table 1. Location and Frequency of Hip Pain in Patients with Intra-Articular Hip Pathology

Location	Frequency, %
Groin only	43
Trochanter only	18
Gluteal only	5
Groin/trochanter	12
Groin/gluteal	16
All locations	3
No hip pain	3
Groin only or groin with other locations	73

Adapted with permission from Khan NQ, Woolson ST: Referral patterns of hip pain in patients undergoing total hip replacement. *Orthopedics* 1998;21:123–126.

DIFFERENTIAL DIAGNOSIS

A positive Stinchfield test must not be confused with the straight leg test for neural irritation. The straight leg test is a passive test in which the examiner elevates the patient's leg a significant distance from the examining table, which, in turn, stretches the sciatic nerve. A positive response is radiation of pain or elicitation of numbness in the distribution of the sciatic nerve. The Stinchfield test is performed with the knee extended and the hip only slightly flexed, and active hip flexion is required.

Extra-articular causes of hip pain, such as iliopsoas tendinitis[2] or abscess, can elicit a positive response during the Stinchfield test. Further, patients with radiographic evidence of hip pathology may have no pain with this test. Both of these scenarios are rare and do not detract from the usefulness and simplicity of the Stinchfield test in distinguishing between intra- and extra-articular hip pathology. **HP**

REFERENCES

1. Dick HM: A tribute to Frank Stinchfield, MD. *Clin Orthop* September 1994:2–4.
2. Kavanagh BF: Evaluation of the painful total hip arthroplasty. In *Joint Replacement Arthroplasty*. Morrey BF, ed. New York: Churchill Livingstone, 1991:782.
3. Khan NQ, Woolson ST: Referral patterns of hip pain in patients undergoing total hip replacement. *Orthopedics* 1998;21:123–126.