Musculoskeletal Radiographic Views and Eponyms

Poster No.: P-0158
Congress: ESSR 2013
Type: Scientific Exhibit
Authors: A. Manzella¹, E. F. T. Souza², M. Soares², A. C. Lima², G. Avelino², L. Barros de Lima³, T. Peixoto³, C. Maciel², R. D. C. Flamini², P. Borba Filho³, D. Lucena²;¹Recife, PE/BR, ²Recife/BR, ³Recife, PERNAMBUCO/BR

Keywords: Image verification, Education and training, Technical aspects, Diagnostic procedure, Conventional radiography, Extremities, Pelvis, Musculoskeletal bone

DOI: 10.1594/essr2013/P-0158
Purpose

The purpose of this presentation is:

1- to review some of the different radiographic projections commonly used to explore musculoskeletal pathology

2- to discuss their clinical indications

3- to illustrate each radiographic view

4- to describe the origin of these eponyms

Methods and Materials

We will review some of the radiographic views used in orthopedics, addressing not only the positioning but also what should be seen and their clinical indications. The origin of these eponyms will also be described. They will be divided in two basic categories: shoulder projections and pelvic and/or hip projections.

Results

GRASHEY VIEW

Technique

True anteroposterior view of the glenohumeral joint (1). The "true" or Grashey AP view differs from the standard AP view in that the patient is rotated posteriorly approximately 35° to 45° so that the plane of the scapula rather than the body parallels the cassette (Figure 1). The beam is still directed perpendicular to the cassette and this eliminates the overlap of the glenoid rim and the humeral head, providing a tangential view of the glenohumeral joint. The advantage of this projection is that it allows for evaluation of the glenohumeral joint space, (Figure 2) demonstrates subtle superior or inferior migration of the humeral head often seen with instability, and detects joint space narrowing seen in arthritis (1,2).

Clinical Indications
Fractures and/or dislocation of the proximal humerus and fractures of the glenoid labrum or brim are demonstrated; may demonstrate a Bankart lesion, erosion of glenoid rim, and the integrity of the scapulohumeral joint; also may demonstrate certain pathologies, such as osteoporosis and osteoarthritis (2).

**RUDOLPH GRASHEY**

Dr. Rudolph Grashey (Figure 3), professor of Roentgenology at the University of Cologne and director of the municipal Roentgen and Light Institute at the Citizens’ Hospital, was born in 1876. Rudolph Grashey was a pioneer in roentgenology on the continent and well known to the radiologists, particularly as editor of "Fortschritte auf dem Gebiete der Röntgenstrahlen". It was founded by Albers-Schönberg, who died as a martyr of his chosen specialty and fifteen years ago Grashey became his successor.

**DIDIEE VIEW**

**Technique**

Patient prone with cassette under the shoulder (Figure 4). Arm parallel to the table top with a 7.5cm pad under the elbow. Dorsum of hand on the hip with the thumb directed upward. Beam angled 45 degrees (1).

**Clinical indications**

The best radiographic view to diagnose glenoid rim fractures is a Westpoint or a Didiee view (2). The osseous Bankart defect on the anteroinferior glenoid rim is best documented in these incidence. In a patient with an unstable shoulder, a radiographic series that includes an internal rotation, a Stryker notch view, and either a West Point or a Didiee view (Figure 5) would maximize the diagnostic yield per radiographic cost, time, and exposure (3).

**ROCKWOOD VIEW**

**Technique**
Anteroposterior without correction of anteversion glenoid cavity and caudal inclination of the beam in 30 degree. (Figures 6 and 7). It Should be done with low penetration radiographic (1).

**Clinical objectives**

Primarily used to evaluate the spur of the anterior inferior acromion in impingement syndrome. The shorter the acromion, the greater this spur (1). The impingement syndrome is a painful condition of the shoulder produced by mechanical pressure on the supraspinatus tendon by the anterior portion of the acromion when the arm is brought into a position of abduction and/or forward flexion (4).

**CHARLES ROCKWOOD**

Dr. Rockwood (Figure 8) has limited his private practice to the study and treatment of shoulder problems for the past 30 years. Although he has discontinued his surgical practice, he continues to see patients in clinic and as a consultant, lends his expertise to other orthopaedic surgeons throughout the country. Dr. Rockwood has authored numerous journal articles and audiovisual presentations and has served as editor of several textbooks.

He graduated from the University of Oklahoma School of Medicine in 1956 and completed his Orthopaedic residency at the Department of Orthopaedics at the University of Oklahoma and affiliated hospitals in 1961.

He served as President of the American Academy of Orthopaedic Surgeons in 1984-85 and president of the American Shoulder and Elbow Surgeons in 1985-87. Dr. Rockwood is a member of numerous national medical associations and an honorary or corresponding member to numerous international medical associations. He served as a Colonel in the United States Air Force Reserve (5).

**ZANCA VIEW**

**Technique**

Anteroposterior with cranial tilt of the beam in 20 degrees (Figure 9) It should be made with low penetration radiographic (1).

**Clinical objectives**
The effect of this technique is useful in the evaluation of the acromioclavicular joint (figure 10), because the cranial angulation eliminates overlapping the back of the acromion (1).

PETER ZANCA

Zanca was born in New York City in 1908. He was an American physician who served as a doctor in the US Army for 25 years, achieving the rank of Colonel, and then served as Professor and founding Chairman of the Department of Radiology for the University of Texas Medical School at San Antonio. Zanca was a prolific researcher and author. He authored or contributed to over 75 articles and exhibits in his career and was credited with the discovery of the "Zanca View". The "Zanca View" is a specific technique used to evaluate acromioclavicular joint injuries (2).

He died of natural causes in San Antonio, Texas (3).

THOMAS VIEW

Technique

It is done with the patient sitting or lying, with cassette placed on the shoulder and the beam directed toward the armpit (figure 11,12) (1).

Clinical objectives

It is a very important incidence used in all affections of the shoulder girdle. When done in an acute trauma, the physician must personally monitor and position the patient (1).

HUGH THOMAS

He has been called "the father of British Orthopaedics". Hugh Thomas (Figure 13) came from a family of bone-setters which descended from the survivor of a shipwreck in 1745 off the north-west coast of the island of Anglesey in North Wales. Hugh was apprenticed to his uncle, Dr. Owen Roberts at St Asaph in North Wales for four years and then studied medicine at the University of Edinborgh and University College, London. He qualified MRCS in 1857 and then returned to Liverpool to help his father, but two years later he moved to another part of the city to set up his independent practice. He was a general practitioner in the slums of Liverpool most of his professional life, treating the
poor rather than the affluent Victorian middle classes. He concerned himself primarily with orthopaedic surgery, and is considered the founder of orthopedic surgery in Britain (6).

**GARTH VIEW**

**Technique**

The patient may be seated or in a supine position, and the arm may be remain in a sling (Figure 14). The x-ray cassette is placed posteriorly, parallel to the spine of the scapula. The x-ray beam is directed through the glenohumeral joint toward the cassette at an angle of 45 degrees to the plane of the thorax and is also tipped 45 degrees caudally (4).

**Clinical Indications**

Identifies the presence and direction of glenohumeral dislocations and subluxations. This view clearly defines the antero-inferior and postero-superior rims of the glenoid and is useful for detecting calcifications or fractures at the glenoid rim (Figure 15).

**WILLIAM P. GARTH**

Dr. Garth (Figure 16) graduated with honors in 1973 from Tulane University School of Medicine. He completed a basic surgical residency at Duke, and an orthopedic surgical residency at the Campbell Clinic in Memphis, after which he was Board Certified in orthopedics in 1980. After serving five years in the private practice of orthopedic surgery, Dr. Garth completed a Sports Medicine fellowship at the Sports Medicine Clinic of Atlanta in affiliation with Georgia Tech.

Dr. Garth has been the Medical Director of UAB Sports Medicine Clinic since 1985 as well as the team orthopedic surgeon for the UAB athletics program while serving as team orthopedist for many Birmingham area high schools. He also serves as a Professor of Surgery for UAB and is active in teaching medical students and orthopedic residents (5).

**VELPEAU VIEW**

**Technique**

With the Velpeau bandage or shoulder sling in place, the patient stands or sits at the of x-ray table and leans backwards 20 to 30 degrees over the table (Figure 17). The x-
ray cassette on the table directly beneath the shoulder, and the x-ray machine is placed directly over the shoulder so that the beam passes vertically from superior to inferior, through the shoulder joint onto the cassette (1).

**Objective**

It is a modified form of axillary profile (Figure 18). Used in patients who have upper limb immobilized after a reduction or surgery. Should not be indicated for diagnosis, as a replacement for axillary radiograph (2).

**ALFRED ARMAND MARIE VELPEAU**

Velpeau (Figure 19) was born in 1795. He was a skilled surgeon and renowned for his knowledge of surgical anatomy. He was the author of over 340 titles on surgery, embryology, anatomy and obstetrics. In 1827, Velpeau is credited with providing the first accurate description of leukemia. Also, a wrapping used to immobilize the arm to the chest wall is known as a "Velpeau bandage". There are several other medical terms associated with his name, however these terms are now primarily used for historical purposes only; these include: "Velpeau hernia" for the femoral hernia, "Velpeau's canal" for the inguinal canal and "Velpeau's fossa", also known as ischiorectal fossa (3).

**DUCROQUET VIEW**

**Technique**

The patient is positioned in the supine position with the hip flexed to 90 ° and abducted 45 °, and the central ray must be perpendicular to the root of the thigh (Figure 20).

**Clinical indications**

In this incidence (Figure 21), it is possible to assess the loss of concavity of the anterior portion of the transition head / femoral neck in cases of IFA cam type.

**DUNN VIEW**

**Technique**
The patient is placed in orthostasis, with the hip of interest along the chassis. The line between the shoulders of the patient should be angled at 65 °, and the foot side to be studied must be parallel to the chassis. To determine whether the radiograph was well placed, there must be a distance between the femoral head heads (1). Through this incidence, one can evaluate the articular space in the anterior and posterior compartments (1,2) (Figure 22).

Clinical indications

The Dunn view, originally described in 1952 for measuring the antversion of the femoral neck in children, is now commonly used for assessment of femoral head sphericity in young adults (Figure 23) suspected of having cam-type femoroacetabular impingement.

DENNIS M. DUNN


LEQUESNE VIEW

Technique: The patient is placed in orthostasis, with the hip of interest along the chassis. The line between the shoulders of the patient should be angled at 65 °, and the foot side to be studied must be parallel to the chassis (Figure 24). To determine whether the radiograph was well placed, there must be a distance between the femoral heads.

Clinical indications: Through this incidence, we can evaluate the articular space in the anterior and posterior compartments (Figure 25).

MICHEL LEQUESNE

Dr. Lequesne is a staff member of The Rheumatology Department of Hospital Léopold Bellan, Paris, France. The Lequesne view was described in 1952.

FERGUSON RADIOGRAPHIC VIEW
Technique

The patient is supine and the tube is angled 30 to 35 degrees cephalic and is centered to the midportion of the pelvis. With this projection, the symphysis pubis overlaps the sacrum (Figure 26). This projection is often required to show the sacroiliac joint (Figure 27).

Clinical indications

The Ferguson projection of the sacroiliac joint is often necessary in the evaluation of some diseases such as inflammatory conditions that involves the sacroiliac joints as part of a systemic or local inflammatory process. Most are arthropathies and include ankylosing spondylitis, inflammatory bowel disease, and psoriatic arthritis. Some pelvic fractures are also included in the propedeutic of Ferguson view, as the sacrum, pubis and isquium fractures.

ALBERT B. FERGUSON JR.

In 1953, at the young age of 34 years old, Dr. Ferguson (Figure 28) chaired the Department of Orthopaedic Surgery and held that position until 1987. During his time as Chairman, Dr. Ferguson established the Orthopaedic Residency program and the first research laboratory. Additionally, he pioneered the use of new materials for hip and knee replacements and trained dozens of the top orthopaedic surgeons. Dr. Ferguson received numerous honors and recognition, including election as president of the American Board of Orthopaedic Surgery [ABOS] and the American Orthopaedic Association [AOA].

LAUENSTEIN VIEW

Technique

To make a lauenstein radiographic of the hip, the patient should be positioned supine on the x-ray table with the affected limb flexed at the knee approximately 30° to 40° and the hip abducted 45°. The heel of the affected limb should rest against the medial aspect of the contralateral knee. The cassette is placed so that the top of the film rests at the anterior superior iliac spine. The crosshairs of the beam are then directed at a point midway between the anterior superior iliac spine and the pubic symphysis. (Figure 29). It is also called frog leg position and shows the anterior and posterior aspects of the thigh.

Clinical indications
This projection provides accurate visualization of the femoral head-neck offset in patients being evaluated for femoroacetabular impingement (Figure 30).

PENNAL VIEW

Technique

The patient is positioned in supine, and the central ray entered 40 degrees cranially and centre in the midline 4cm below the upper border of the symphysis pubis (Figure 31)

Clinical indications

This tangential view is helpful in disclosing superior displacement of the posterior half of the pelvis and either superior or inferior displacement in the anterior portion of the pelvis (Figure 32) It’s used in trauma approach, for example in an anterior compression against the anterior superior spines when this mecanism produces a typical fracture pattern with separation at the symphysis pubis and a corresponding degree of separation at both sacroiliac joints anteriorly, also called open book type

GEORGE F. PENNAL

Dr George Pennal (Figure 33) was born in 1913. He had a major interest in pelvic disruption for more than 25 years, originally simulated by a clinical review of 354 pelvic disruption presented to the Canadian Orthopaedic Association in 1958. With Dr Gordon Sutherland, a radiologist, Dr Pennal described three X-rays views : an anteroposterior, an inlet and outlet view, to define the patterns of displacement of pelvic ring disruption. Unfortunately, Dr Pennal did not live to see much of his work published. He died in 1976.

Images for this section:
Fig. 1: Grashey positioning. Patient upright. Body rotated posteriorly 35-45° toward affected shoulder. Arm maximally externally rotated.
Fig. 2: Grashey view.
Fig. 3: Rudolph Grashey
Fig. 4: Schematic drawing. Didiee view. Positioning.
Fig. 5: Didiee view
Fig. 6: Rockwood projection. Anteroposterior without correction of anteversion cavity glenoid, and caudal inclination of the beam in 30 degrees.
Fig. 8: Charles A. Rockwood Jr.

Fig. 9: Zanca projection. Anteroposterior with the tilt of the beam in 20 degrees.
Fig. 10: Zanka view
Fig. 11: Thomas incidence. The patient is lying, with the casset placed on the shoulder and the beam in toward the armpit.

Fig. 12: Thomas view
**Fig. 13:** Hugh Owen Thomas.

**Fig. 14:** For the Garth position, the patient is in supine position, and the arm may be remain in sling.
Fig. 15: Garth view
Fig. 17: For the Velpeau view, the patient with velpeau bandage sits at the of c-ray table
Fig. 18: Velpeau view
Fig. 19: Alfred Armand Louis Marie Velpeau
Fig. 20: Lequesne projection. The patient is placed in orthostasis with the hip of interest along the chassis.

Fig. 21: Lequesne View
Fig. 22: Ducroquet projection. The patient is placed in the supine position with the hip flexed to 90 degrees and abducted 45 degrees.

Fig. 23: Ducroquet view
**Fig. 24:** For the Dunn technique the patient is placed in orthostasis with the hip of interest along the chassis.

**Fig. 25:** Dunn view
Fig. 26: For the Lauenstein projection, the affected limb is flexed at the knee 30 to 40 degrees and the hip is abduced 45 degrees.

Fig. 27: Lauenstein view
Fig. 28: For the ferguson projection the bean is angled 30 to 35 degrees cephalic and centered to the mid pelvis.
Fig. 29: Ferguson view
Fig. 30: Albert B. Fergunson Jr, on the right.
**Fig. 31:** For the outlet projection the bean is directed at an angle of 40 degrees, cranially to the mid-pelvis.
**Fig. 32:** Pennal view.
Conclusion

Eponyms are still widely used in the medical literature and clinical practice and familiarity with these eponyms is important for accurate communications with radiology colleagues and clinicians.

References

14. Nunes RB, Amaral DT, Oliveira VS. Radiological propedeutics of femoroacetabular impingement in times of computed tomography and


Personal Information

AUTHORS

ADONIS MANZELLA MD, MSc

ELAINE FERNANDA TAVARES DE SOUZA MD

MARINA FEITOSA SOARES MD

ANNE CARINE DE LIMA MD

GUSTAVO HENRIQUE BEZERRA AVELINO MD

LUANA THAYSE BARROS DE LIMA MD

PAULO BORBA FILHO MD, Professor

TALITA PEIXOTO MD

CARLOS MACIEL MD
RODRIGO FLAMINI MD

HOSPITAL DAS CLÍNICAS - UNIVERSIDADE FEDERAL DE PERNAMBUCO

RECIFE - PERNAMBUCO - BRAZIL

Fig. 34: BEACHES - PERNAMBUCO - BRAZIL

References: internet

adonismanzella@yahoo.com.br
Fig. 35: RECIFE - PERNAMBUCO - BRAZIL

References: Radiology, Universidade Federal de Pernambuco, Hospital das Clinicas - Recife/BR

Images for this section:
Fig. 34: BEACHES - PERNAMBUCO - BRAZIL
Fig. 35: RECIFE - PERNAMBUCO - BRAZIL