Nailing versus Plate Fixation
Two Methods of Fixation: Locked Intramedullary
Nailing versus Intramedullary Locked Nailing
Prospective Randomised Study of Outcomes in

By

Dr. Zainali Abeeran Alubhekar Peer
Day of 2010
Zainal Abderen Ahmed Peer

Declaration

I, Zainal Abderen Ahmed Peer, hereby declare that this Research Report is my own work. It is being

member of the research team is affiliated to
division, centre, clinical practice or other charitable or non profit organization with which I or a
entity paid or directed or agreed to pay or direct any benefits to any research fund, foundation
commitment or agreement to provide such benefits from a commercial entity. No commercial
family, nor affiliated university or department received any benefits of any other benefits or e
in support of this research or preparation of this work. Neither I nor any member of my team or
to the University. I further declare that I did not receive any outside funding or grants
W ithdrawal, J ohnson, Sarah, S elegant, Mr. Allen, M. The results of this study are not
submitted for Master of Medicine in the branch of Orthopaedic Surgery to the University of the


Thank you to my daughter Elize, whose presence helped me to see the truth and to find the path.

Thank you to all the friends and colleagues who have helped me and supported me through this journey.

Thanks to all the registers who helped with the case.

Thanks to all the friends and colleagues who have helped me along the way.

I would like to thank Dr. Ahmed, my supervisor, for his support and encouragement.

In the name of God, the most gracious and most merciful, the Lord of the worlds and what is
Conclusions were similar in both groups.

Significant findings in the primary group in the early post-operative period. All the other
was significant in patients older than 45 years. Elbow pain and decreased range of motion were
compared to one in the null group. In the null group shoulder pain and decreased range of motion
significant subjective differences. Five patients in the primary group developed radicular nerve pain.
WOMAC (0.017) Functional scores (Comsas, HSS Elbow score and WOMAC) showed no
opposite block loss was almost half of that in the primary group (65 minutes vs. 30 minutes - p value = 0.011) and there-
group than in the group (65 minutes vs. 30 minutes - p value = 0.011) and there-
well with intramuscular steroids. Mean operative time was nearly half an hour less in the treated
score. The total re-union rate of elbow and shoulder was thus 71% (s.e. 8.9%), which compares
planned groups. The non-union rate following primary was 7.2% (n = 11) in the treated
achieved in 24 cases by 9-12 weeks (range 20 to 36 weeks). Three patients did not unite in the
(range 20 to 36 weeks). Three patients did not unite in the
were achieved in 24 cases by 9-12 weeks (range 6 to 12 weeks). These patients did not unite in the
(range 6 to 12 weeks). These patients did not unite in the
did not unite in the
(mean time to union 8.6 weeks).

RESULTS. Lected intramuscular pathway had a shorter operation time and less block loss than
clinically by the author and statistically by an independent radiologist.

The mean time of final review was one year after operation. All follow-up they were assessed
measurement: 32 of them by intramuscular method and 27 by plain. All patients were followed up:
the University of Wisconsin. They were randomly allocated to either of the two modalities of
by the author and statistically by an independent radiologist.

Immediately following versus placing in humeral shaft fractures, in terms of healing time,
outcome and complication rates.

Intramuscular method versus placing in humeral shaft fractures, in terms of healing time,
require an equal treatment for optimal outcome. The aim of the study was to compare
16.4% Most of them healed with adequate conservative treatment. However a small number will
Fractures of both shaft of the humerus represent between 3 and 5% of all long bone fractures [15].

ABSTRACT
Counselors in our setting relishing proved much easier to do than planning with better

Conclusion: In our setting relishing proved much easier to do than planning.
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List of Tables
WOMAC - Western Ontario and McMaster Universities

tgf-β - Transforming Growth Factor Beta

ON - Ontario
tcddp - Low-conduct Dynamic Compression Plate

IMN - Intermediate Nail

hss - Hospital for Special Surgery

pgf - Placental Growth Factor

DCP - Dynamic Compression Plate

BMP - Bone Morphogenic Protein

AO - Arbeitsgemeinschaft Unfallchirurgie (Association for the study of Internal Fixation)
Celsius (258°C-304°F) decreased since the early 19th century due to improved surgical techniques and dressings.

The need to improve surgical techniques in the early 19th century led to the development of new instruments and techniques for surgery. This included the introduction of the scalpel, which was a significant advancement in surgical practice.

The discovery of X-rays in 1895 and their introduction into medical practice marked a significant milestone in the history of surgery, allowing for the visualization of internal structures and the planning of surgical procedures.

Historical Review

Introduction

...
used external mobilization for the treatment of lumbar spine facet arthropathy before the advent of described the complications of excessive traction and high-banding. Clearly, another doctors should recognize from our own experience.

Abstract. From the author's own case studies [12], a similar clinical picture could be observed. The patient had been suffering from chronic back pain for several years. After undergoing several different treatments, including surgery, the pain persisted. The patient was referred to our clinic for further evaluation.

Case study from author's own case studies [12].

Figure 1. Abstract from the author's own case studies [12].
Intraarticular fractures are not uncommon, especially in the elderly. They are often associated with other injuries. The hallmark of a displaced intraarticular fracture is the inability to maintain weight-bearing on the affected limb. The patient may also have pain, swelling, and deformity. The treatment is usually surgical, involving reduction and fixation of the fracture. After surgery, immobilization in a cast is often necessary for several weeks.
consists of a prominent ridge which gives insertion to the tendon of the biceps musculature on the medial epicondyle. Its upper third
for the attachment of the lateral intermuscular septum.

Lowers muscle below and posterior to the head of the triceps brachii muscle and in intermediate increase
an anterior hip for the origins of the brachioradialis muscle abroad and extensor carpi radialis
promontory on the margin which is a little curved forward. The lateral supinator muscle presents
a broad but shallow oblique depression, the musculotendinous groove, its lower part forms a
below this groove origin of the lateral head of the triceps brachii muscle, its center is traversed by
marked seration for the attachment of the lower part of the biceps and median ulnar insertion and
separates the anterior from the posterior surface. Its upper half is rounded and indistinctly
The lateral border runs from the back part of the greater tubercle to lateral epicondyle and is
muscular.

Bordered superiorly by the is smooth and rounded attachment for the pronator
insertion of the bicipital epicondyle. At the center it forms the anterolateral border of the
below. Its upper part is a prominent ridge. The center of the greater tubercle serves for the
the anterior border runs from the root of the greater tubercle above to the coracoid process.

Borders

It has three borders and three surfaces.

Width length. The shell is almost spherical in the upper half and prismatic and flattened below.
composed bone, thicker at the center and contains a large medullary channel which extends along its
can be bone, covered with a thin, compact layer. The shell is composed of a cylinder of
This work the body of the humerus will be referred to as the shaft. The extremities consist of
The humerus is a long bony tube with two extremities and a body, the diaphysis or shaft. In

Anatomy
The muscular – perineal system

Sources (Figure 2, 3):

As an organ bone receives 5 to 10% of cardiac output (A). The numerous venous blood from there

Bone formation and Physiology

Muscle

Nearby the whole of the surface is covered by the lateral and medial heads of the iliac crest. Between the insertion of the coccygeus is covered by the lateral and ilial heads of the iliac crest, and the rectus abdominis muscle. The posterior surface appears somewhat invaginated so the insertion of the lacrimalis dorso-medially, the middle part is slightly raised by the attachment of the lacrimalis dorso-medially. The antebrachial surface is less extensive than the tendinous surface and is directed medially.

The brachial muscles are located in the area of the brachial plexus. The brachial muscles are located in the area of the brachial plexus. The brachial muscles are located in the area of the brachial plexus.

An intermuscular ridge for the attachment of the medial intermuscular

The brachial muscles and the pronator teres muscles and a posterior for the medial head of the

Slight ridge, which becomes very prominent below it presents an anterior for the origins of
canal at the commencement of the radial sulcus. The insertion of the radial sulcus. Sometimes there is a second nutational

Muscle. At its center there is a slight impression for the insertion of the coracobrachialis muscle.

Surfaces

Septum
Figure 2: Blood supply of a long bone.

1. The nutrient artery supplies blood to the entire bone, branching into branches that enter the medullary cavity and supply the bone marrow.

2. The nutrient artery branches into branches that enter the diaphyseal canal (outer and inner table of the periosteal sleeve).
In the emphysema-venous system, blood flow delivers nutrients to the alveoli of the lungs. Blood flow is controlled and regulated by the venous system, which drains into the right side of the heart and the pulmonary system, which returns blood to the left side of the heart. Venous flow in the emphysema-venous system is more prevalent and blood flow is centrifugal (inside to outside). Vascular flow in the emphysema-venous system is centrifugal, and the pulmonary system pressure is lower than the pressure in the emphysema-venous system (Figure 2). In a completely displaced lung, the low-pressure effects of the emphysema-venous system decrease the flow of blood towards the brain. The third of the lung, the emphysema-venous system, is a low-pressure system. The emphysema-venous system is composed primarily of capillaries that supply most of the lung.

Under normal conditions, the emphysema-venous system is centrifugal, and the pulmonary system is a high-pressure system. The pulmonary system is a high-pressure system, and the emphysema-venous system is a low-pressure system.}

![Figure 2: Schematic of Blood Flow in the Emphysema-Venous System](image)
is rich in inducible proteins.

Fragment ends are surrounded by cellular debris, capillaries grow into the area. This issue
inflammation and cellular proliferation occur in the granulation tissue and proliferation and
extravasations of blood at the fracture site and hemorrhage formation.

The sequence of bone fracture healing consists of (Fig. 4)

Real let basal expansion is necessary provided the optimal environment is present.
continuity of bone and in order to restore their continuity bone has the ability to heal. Per done to
movement loss of integrity of bone results in decreased function. A fracture is a break in
One of the functions of bone is to provide support and attachment of other tissues and to allow for
Bone is the major structural issue in the human body. It consists of cells and extracellular matrix

Preferable Healing

Correlation of osteogenesis and fracture healing.

That may be useful in the future for the treatment of bone disease-related to different
vascular receptors (P-selectin, mucosal, thromboxane/prostaglandin receptors)
but much less potential for vasodilation. The vessels within a bone have a variety of
arterial system of bone has great potential for vasodilation from the resting state.
Bone blood flow is under the control of metabolic, humoral and autonomic inputs. The
approximately two weeks and then returns to normal between two to five months.

Blood flow increases (as part of the regional acceleration phenomenon) and peaks at
decreased bone blood flow after vascular disruption. With 94 hours to days the bone
injury and it is the major determinant of fracture healing. Initial response to fracture is

Preferable Healing
Area. This issue is rich in inducive properties and manifest ends are surrounded by cellular tissue. Capillaries grow into the
information, and cellular proliferation segment immunologic cells proliferation.

Expression of blood at the precise site and hemostasis formation

The sequence of bone fracture healing consists of (Figure 4)

environment is present.

ability to heal. For bone to heal the ideal location is necessary, provided the optimal
healing is a break in continuity of bone and in order to restore the continuity done has the
and allow for movement. Loss of integrity of bone results in decreased function.
matrix. One of the functions of bone is to provide support and anchorage of other tissues
Bone is the major structural issue in the human body. It consists of cells and extracellular

Fracture Healing

and fracture motion.

unique for the treatment of bone disease related to aberrant circulation, e.g., osteonecrosis
abnormal. Monoclonal immunoglobulin/protein (e.g., receptors) may be useful in the
vascularization. The vessels within a bone have a variety of vascular receptors (e.g.,
has great potential for vascularization from the existing site, but much less potential for
under the control of metabolic, humoral and endocrine inputs. The arterial system of bone
two weeks and then returns to normal between three to five months. Bone blood flow is
increase (as part of the renal autoregulation phenomenon) and peaks at approximately
Bone blood flow after vascular disruption, which hours to days the bone blood flow
to the prevailing stress on the bone.

Remodeling – The fracture site and surrounding bone are remodeled according

shrinkage this bone.

the next few months, the continued laying down of new matrix by osteoblasts

Consolidation – callus (woven bone) is transformed into lamellar bone. Over

to have "healed."

Bone morphogenetic proteins (BMP), at the end of this stage, the fracture is said

fibroblast growth factors (FGF), transforming growth factor beta (TGF-β) and

process is driven by inducers proteins such as

osteoclasts. This mass becomes more densely mineralized and more bone at the

endochondral and osseous tissue. Form bone cells (above) are potentially

resemble the normal structure.

and the fracture site solidity united (e) Remodeling: the new-formed bone is remodelled to

appears in the fracture cells (d) Remodeling: woven bone does replace by lamellar bone

changes to osteoblasts and osteocytes. Bone is modeled and woven bone

(phosphatase, alkaline) cells appear in the haversian system (e) Cells: the cells

healing. Five stages of healing (a) Hemostasis: there is tissue damage

Figure 4: Process Healing.
throughout the stage of active growth of cartilage cells and osteoblasts.

The cartilage growth is maintained by a high phosphate level in the cartilage. The phosphate is secreted by osteoblasts, forming the cartilage matrix, and

Within a few days, the phosphate concentration of the cartilage increases six to eight times the

Prophylactic treatment of fracture healing

sustains (16). Only then does dissociation begin,

celullike from the surrounding space, exuding continuity with the

calciuin and phosphate in the fracture hematoma. The increased bone marrow activity and osteoclasts cause resorption of bone

Histamine and acceleration: in all tissues, a decrease of histamine and acceleration of cell proliferation

level remains unchanged and the local excess is derived from the bone ends

concentration of calcium and phosphorus in the fracture hematoma. The general blood calcium

measures and repair of soft tissue injuries. In the first few weeks the bone is rapidly increased

Deposition of calcium in the cartilage tissue contributes the important difference between repair of

Biomechanical Properties of Fracture Healing

Fracture healing:

The fracture heals. These changes may also occur after injuries of soft tissue without the

part in the first few days after the fracture. In nearly all cases the loss of phosphorus from the

concentration of organic phosphorus in the cartilage may occasionally be increased to about five

of calcium is not disturbed after fractures. The increase and continued normal. The

metabolic response to trauma while restoring fractures and osteotomies. The General metabolism

loss of nitrogen, phosphorus and reduction of collagen. Later, in 1930, Collinsson first discovered the

Properties like any other injuries are followed by the normal metabolic response to trauma with

Biomechanical Properties
If bone is not neatly resorbed and there is motion at the fracture site bone heals by callus.

(b) Secondary bone healing

(6) By direct penetration of the fracture gap by callus (cone)

![Diagram](image)

This type of healing occurs in anatomically reduced, stable fixed fractures. Healing occurs by

Primary bone healing

There are 2 main types of bone healing:

Type of Bone Healing

In healing does not accelerate repair. Although it is due to local biochemical activity; increasing the blood calcium levels by calcium

During the first two weeks of the fracture, the hematoma shows a marked acid level increase.

And Type of Primary Hematoma
movement of the cells differentiate into synovial cells and a false joint or pseudomarthritis forms.

A very slow process, fibrous union is always unstable. Occasionally, due to excessive resorption in bone ends healing by fibrous union. This could be replaced by ossified formation but it is may

immobilisation is inadequate callus may develop. With excessive motion or bone ends this

Repair by fibrous union: The mesenchymal cells or chondroblasts form bone but if

Problems with bone healing

excessive [33].

callus (a) This patient had certain irritation and itching around which; in three weeks callus is
and there is no calcifies (b) lack of tissue the cartilage is loosey permitting some movement, so there is a
both six weeks after operation in (a) the knicker will likely prevent any movement.

Figure 6. Callus and Movement. These pressures with femoral shaft fractures (a) and (b) are
Non union should always be considered in any non-union.

Disuse, other complications, (ingrowth of necrotic bone), non-union or failed treatment, failure of methods (non-operative stabilization of treatment failure, failure of biology (high energy injury with devascularization) or real factors (smoking, vascular)

Stable fracture. This is generally accepted as six months from time of injury. Non union is due to least three months after this period of time during which normal fracture union was expected to Non union is defined as failure to show any progressive change in radiographic appearance for at least

To unite, the expected time for union in a humeral fracture is 6-10 weeks in an adult.

Reseed for fractures that have not achieved union by the expected time but eventually go on to unite due to progressive change in fracture. This term is usually

Delayed union
In many cases the character of displacement of the fragments is that of the sheil of the
permeability, plastic deformation of cause a complete disruption.

A body is proportional to the product of the mass of the body and the acceleration of
the force and the effects are governed by Newton's second law, which states that the force acting on

If a locomotive injury can cause a human fracture: All fractures follow a similar pattern

Injuries from a missile or motor vehicle accident results in a comminuted fracture. An
injury to the middle third of the humerus [Kaiser et al.,

The proximal end of the humeral bone is to form a bony head to the comminuted bone results in fractures of the
fractures are defined as fractures in which the major plane line occurs

Human shaft fractures could lead to shortening of the limb or a comminutally unacceptable limb.

The bone involves the amount of deviation from normal will have variable effects. This

Union of the fractured bone in position other than anatomically correct is defined as
is commonly used at our institutions. The possible types of neuronal shift factors are shown

in the accompanying pattern with each letter and number corresponding to define the feature at a level. If recitation similar to that applied in a real clinical setting, features are coded in


methods of coding Information Storage and Retrieval systems.

of the work, it is essential that they be based on accepted methodologies. Please note especially various influences. Clinical need them for research and clinical audit and to measure the outcomes.

results for similar features. They play a pivotal role in the description and classification of

Classification are instrumental in defining the characteristics of a feature and for defining

Classification of Human Shift Factors

and is driven outward by the deltoid and by the action of the supraomohyoid

upper external is displaced anterio by the shoulderblades and rotated portion of the deltoid

the features. The role of feature is not to be above downwards and outwards. The

influence of other muscles, the humerus, coracobrachialis and triceps increase the overgrip of

and tend to draw it towards the body, whereas the deltoid tends to draw it away from the body. The

muscles (coracobrachialis, longus biceps, and longus coracis) are attached to the upper external

The bone may be reduced immediately above the deltoid insertion. In this case the deltoid head

away from the body or directly anterior.

influence most markedly in producing displacements in these directions vice towards the body.

The humerus is one of the most frequent of any bone in the body. Muscular action shows its

cases rarely fractures. Notwithstanding this latter fact non-union of fractures of the shaft of

uncommonly in diaphysal fractures. The fracture heals usually more or less oblique and in rare
Figure 10: AO Type C Fractures

Complex Irregular

Complex Segmented

C3

C2

C1

Complex Segmented and C3 complex Irregular (Figure 10).

AO Type C fractures are more complex fractures, with C1 behaving complex spiral C2.

Figure 9: AO Type B Fractures

Fractured Wedge

B3

B2

B1

Wedge, B2 bending wedge, and B3 fractured wedge (Figure 9).

AO Type B fracture is a fracture with an extra buckle. Fractured with B1 being a spiral.

Figure 8: AO Type A Fractures

Transverse

Oblique

Span

A3

A2

A1

Transverse (Figure 8).

AO Type A fractures are simple fractures, with A1 being spiral A2 oblique and A3
Procedure

The medial nerve lies between the brachialis and biceps brachii and it must be protected throughout the approach. The brachialis is retracted medially and the biceps laterally. At this level the axilla is entered. The axillary artery and vein are identified. The brachial plexus is then divided. The brachial plexus is then divided. The brachial plexus is then divided. The brachial plexus is then divided. The brachial plexus is then divided. The brachial plexus is then divided. The brachial plexus is then divided.

The anterior approach (Figure 1) is used most widely in proximal and middle third of the deltopectoral interval.

The extended approach (Figure 2) allows exposure of the clavicle and first rib. This allows exposure of the clavicle and first rib. This allows exposure of the clavicle and first rib. This allows exposure of the clavicle and first rib. This allows exposure of the clavicle and first rib. This allows exposure of the clavicle and first rib.

Many surgical approaches have been described for open reduction and internal fixation of the proximal humerus. These include the extended lateral approach, the anterior approach, the lateral approach, and the subpectoral approach.
The cephalic vein is an important landmark.

Identical to the anterolateral approach taking advantage of the deltopectoral interval with exposing the anterior surface of the humeral shaft, proximally the anterior approach is

brachialis muscle is exposed and the fibers of the brachialis muscle are split longitudinally

proximal to the elbow flexion crease. The inframuscular interval between the biceps and

then the anterolateral approach, the distal limit of the incision is approximately 2 cm

The anterolateral approach is used less commonly because it is less useful and less extensive.
of the iliacs, here exposes the posterior aspect of the humerus.
the iliacs and reach the ilium. The course of the femoral nerve is not immediately
head if necessary. The femoral nerve should be located along the lateral border of the medial head of
head of the iliac crest. The iliac crest is located behind the exposure of the medial
between the lateral and long heads of the iliacs muscle is located the exposure of the medial
between the lateral and long ends of the iliacs muscle (Figure 12). The proximal extre of the
between the lateral and long ends of the iliacs muscle (Figure 12). The proximal extre of the
Figure 12: Posterior approach to the shaft of humerus. [1]
Although the fracture pattern and location may dictate which surgical exposure is most.
cause of intramedullary and soft tissue postoperatively. A conventional hemi-arthroplasty was cited as a potential advantage until recently, because the mesh is a threat to the function of the knee and internal gravity of the hip. This does not allow direct access to the joint medially and, thus, the nail had to be placed medially. Preoperatively, described an approach of the hip through the surgical incision which have showed that this approach has been used as a result of muscular, dissection, which have showed that the outer external approach has been developed for intramedullary nailing. This direct visualization of the cortex will minimize the thermal of nerve injury.
Improved biomimeticity.[29]

... efficiently transfers the humerus by HRN because there is less tissue violation and
know how to transfer it in a safe and rockwood and green recommendation of
fixation is necessary for appropriate placement. The surgeon must always be vigilant and
be directly applied to ensure of the humeral shaft. The knowledge of other forms of
the advantage of intramedullary fixation that is applicable to the lower extremity may not

Indications should be accurate.

There are many ways of "skinning a cat" and the surgeon should plan his surgery and the

... is an absence of shoulder dislocation with reinsertion of the humeral head. Dislocation can also be performed.

... proposed advantages of a more direct entry portal is decreasing the potential risk

dislocation associated with antegrade nailing.

Medially canal. The development of this approach was done to lessen the risk of shoulder

at this point in our experience has been minimal and there is better access to the

undertaken with the shoulder extended approximately 30 degrees. The rotator cuff insertion

Therefore it is recommended that an insertion anterior to the acromion should be
Research questions

The question asked in this research: How does nailing and plating of humeral shaft fractures compare in terms of rate of union, functional outcome and complications?
Exclusion criteria

- Patients were excluded from the study if they met any of the following criteria:

  - Presence of cervical neck and 5 cm proximal to occlusion fossa
  - Presence of subluxation >2 cm or degree >0.5 cm
  - Presence of fracture with fracture gap >0.5 cm
  - Noticeable hemorrhage
  - Skeletally immature patients

The inclusion criteria were outlined as follows:

Inclusion criteria

The surgery was done at Chittagong Medical College Hospital, Chittagong Medical College Hospital, and Helen Joseph Hospital, most of the surgeries were done at CMC Hospital, Chittagong Medical College Hospital.

This study was approved by the Human Research Ethics Committee of the University of the:

Materials and Methods
considered to carry about 25% or 50% of blood. Any unusual intravenous findings were
thoroughly documented. In the absence of the anesthesiologist, the same was
performed in Appendix B. It documented the exact amount of the drug and the
size of the compounds used.

A list of the operations performed is presented in Appendix C. The patient
history, medical history, and the general health status of the patient were
considered. The medical history of the patient and the general
condition of the patient were documented.

Johns Hopkins Hospital, 600 North Broadway, Baltimore, MD, 21251. The
authors of this paper are

All operations were performed under general anesthesia, in the operating
room.

Study

According to the AO classification system as shown on the same sheet,
the study was designed to include two systems: the AO.

A chart was completed for each patient examined. A list of the patients
assessed was obtained prior to inclusion (Appendix A). When a patient
was assessed, all possible data was collected by the study. Data was
taken from the medical history, the patient’s health status, medical
condition, and the patient’s general health status. The data was
brought to the appropriate division of the study. Inclusion and exclusion
criteria were

All members of the appropriate division of Orthopedic Surgery at the
University of Western Ontario were

Relevant

Psychos

Fractures < 21 days old

Grade IIIb or compound fractures

Previous history of humerus
the shoulder. Possible scores range from 0 to 75, with higher scores corresponding
II is composed of individual scores of pain, activity of daily living, and range of motion of
a shoulder specific score used to measure shoulder function.

collates and the patient could use their arms without discomfort. The modified Constant Score
was considered to be achieved when Bridging Callus was seen on the radiographs in at least two
function we used the modified Constant Score HHSS, Elbow score and WOMAC score. Union
assessed. The primary outcomes measured were non-union and functional outcome. To assess
At mean follow-up time of 11.8 months from the operation (3 months to 3 years), all patients were

**Final assessment**

**where applicable**

into a spreadsheet. If forms were not available then information was taken from the doctors’ notes.
complete the forms. The investigator then collected these forms and X-rays. The data was entered
positions were placed in consulting rooms remaining doctors to look over these patients and
and consultants were requested to complete the forms when following up any study patients.
were delivered by the author to the orthopaedic registrar of each hospital. Registrars
registered. The follow up forms (Appendix D) and radiological assessment forms (Appendix C)
however in some instances, when this was not possible, the assessment was done by the local
months 6 months and 1 year. In most cases, follow up was carried out by the investigation
The initial protocol called for follow up of patients at 6 weeks, 10 weeks, 14 weeks, 18 weeks, 6

**Follow-up**

intra-operative complications. This data was collected by the operating team.
TABLE 1. Type of fractures (simple, special, fracture or midshaft) was the most common, and type C midshaft was fractured in around 80% of the cases. The proximal and distal thirds in 20% of the fractures formed almost 95% of the cases. The breakdown of fractures is shown in Table 4. The cases were in young patients, 7 were assenaled and 7 were due to a fall (Table 2). AO type A & B involved in 27, Traffic related accidents caused those fractures in 45 patients and most of were Grade I open fractures. The right numbers was involved in 32 patients while the left was 30. Average age was 19 years (range 16 - 66 years). Fifty-six fractures were closed and 24 were open. Distribution was bimodal with a major peak in the third decade and a minor peak in the fifth. Thirty-two of them were treated with IMF and 27 with plating (Table 3). The overall age distribution contains 55 patients with traumatic fractures. There were 23 females and 32 males.

DEMONSTRATIONS

RESULTS

of complications and the need for further operations. Scores corresponding with higher function. Secondary outcomes of the study were the incidence individual scores of pain, stiffness and function. Possible scores range from 0 to 100 with lower difficulties have a person may have in performing activities of daily living. It is composed of to higher elbow function. WOMAC score is a general patient-based score that assesses movement and disability. Possible scores range from 0 to 100 with higher scores corresponding function. It is composed of functional scores of pain, function, muscle strength, range of motion. The HSSE score is an elbow-specific score used to measure elbow.
Table 2: Mechanism of Injury

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Percent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVA</td>
<td>10%</td>
<td>7</td>
</tr>
<tr>
<td>MVA</td>
<td>64%</td>
<td>38</td>
</tr>
<tr>
<td>FALL</td>
<td>12%</td>
<td>7</td>
</tr>
<tr>
<td>ASSAULT</td>
<td>12%</td>
<td>7</td>
</tr>
<tr>
<td>Reg.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Gender breakdown in the two groups

<table>
<thead>
<tr>
<th>Gender</th>
<th>Total</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>59</td>
<td>27</td>
<td>32</td>
</tr>
<tr>
<td>Male</td>
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<td>14</td>
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</tr>
<tr>
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<td>23</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nail</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Features were the least common. The breakdown of the fracture in the 2 groups is shown in...
Support was used in all patients for post-operative pain relief.

Inhibition was required for either group. For postoperative drainage a simple collar was used.

Table 2. The mean operation time for patients with a solitary humeral shaft fracture was 66 minutes [35.10]

Pearson chi² (2) = 0.4845, P = 0.72. Fisher's exact = 0.913.

Table 3. Fracture type breakdown in the 2 groups.

<table>
<thead>
<tr>
<th>Type</th>
<th>Plate</th>
<th>Nail</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>99</td>
<td>3</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>14</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>28</td>
<td>12</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
significant lower blood loss.

Greater blood loss than the other types of fractures. Type A fracture patients showed a
of injury and blood replacement is very costly. Type C fractures that were placed had a
about 30 mL. This is important because patients can lose about 500 mL of blood at the time
place groups (95 mL vs. 180 mL). In the null group the smallest amount of blood loss was
patients in the null group had much lower blood loss during surgery as compared to the
number of gauge swaps. A volume of 25 ml/swab was proposed by the anesthesiologists.
Blood loss was estimated by adding the volume of blood in the suction bottle to the

Any further treatment

One had a Rush pin inserted, one used uncreatively after redo plating and this resulted

with the fracture by 9-12 weeks [range 6 to 12 weeks]. The plate group went on to union,

and was lost to follow-up. Among the plate group union was achieved in all but

remaining and subsequently united in two months. The other patients decided further

showed no calluses by six months. One of these patients underwent an exchange nail with

months, with a mean time to union of 8.6 weeks [range 6 to 12 weeks]. Two fractures

In the null group, all except two fractures had united an average follow-up of 11.3

Preoperative Healing

elsewhere.

Shifting to another department; this was radiologically significant but not functionally.

position. The four less than ideal results had fractures that united in 10-12 weeks and a

but the rate of union did not differ in the plate group. 2/77 fractures healed in good

Differences in time to union were substantially significant between the two groups (Fig.

Fully lower constant scores were noted in patients with previous history of rotator cuff""""•

receptor cut tendons. In both groups most patients younger than 45 years recovered early postoperative period. This is not unexpected because of the surgical interference with most patients in the IIN group presented with some degree of shoulder impingement in the average score for the placebo group was 65 (Figure 1a). This was not statistically significant assessment, the average modified Constant score for the test group was 77, and the in all of the patients, the treated side was compared to the healthy side. At final Modified Constant Score

Functional Outcome.

Figure 1.5 average time to healing.
78.5, compared to 88.78 in the null group (p = 0.314) (Figure 17).

The plate groups in the first 3 months. The average HSS Elbow Score in the plate group was 11.45.

All final follow-up patients in the null group had statistically better HSS Elbow Scores than

HSS Elbow Assessment Score

Figure 1G Comparison Score in the 2 Groups

The bar graph on the left shows the comparison of the two groups, with the null group having a consistently higher mean score throughout the follow-up period. The graph on the right highlights the distribution of scores, indicating a narrower range in the null group compared to the plate group.
Table 4 WOMAC score in the 2 groups

<table>
<thead>
<tr>
<th></th>
<th>69</th>
<th>100%</th>
<th>27</th>
<th>100%</th>
<th>32</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>5</td>
<td>7%</td>
<td>2</td>
<td>9%</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Mild</td>
<td>5</td>
<td>11%</td>
<td>3</td>
<td>6%</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>None</td>
<td>46</td>
<td>81%</td>
<td>22</td>
<td>84%</td>
<td>27</td>
<td>51</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td></td>
<td>52</td>
<td></td>
<td>80</td>
<td>148</td>
</tr>
</tbody>
</table>

In each group five patients had a score between 24 and 40 (Table 4). The WOMAC scores were better in patients who were younger. This suggests that some degree of shoulder and/or elbow improvement does occur in older patients regardless of the technique used.

In each group five patients had a score between 24 and 40 (Table 4). The WOMAC score was 0 in 84% of the matched cases and 81% of the placebo cases (N.S.).

At final follow-up, the whole series a score of 0 was recorded in 49 patients out of 49.

WOMAC

Figure 17 HSS Elbow Assessment Score of Both Groups
Table 5: Completions

<table>
<thead>
<tr>
<th>Completion</th>
<th>Total</th>
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<tbody>
<tr>
<td>0</td>
<td>3</td>
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<tr>
<td>1</td>
<td>0</td>
</tr>
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<td>3</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Interoperative complications

Intraoperative infection

Non union

Severe Limb loss of function

Minor loss of function

Complete Palsy of the Radial Nerve

PlA TE

NAIL

had superficial infection that settled with antibiotics.

Inevitably after wound debridement and antibiotics. In the nail group only one patient developed ARSA in the wound. A Her further surgery to remove the plate she went on to develop deep infection. The latter one was a 62-year-old lady with grade IB compound fracture who subsequently required plate removal. Two patients developed superficial infection and there was one with deep infection. The plate removed in one patient 6 months after the surgery to remove. In the plate group however in one patient it took six months for the nerve to recover. In the plate group primary nerve repairs were performed in five patients in the plate group. Overall there were fewer postoperative complications in the nail group as compared to the

Conclusions and Secondary Procedures
Intervention may include compression plugging, immediate clipping, or external fixation.

With improved implant technology and surgical technique, operative repair of humeral
fractures have become common nonoperative treatment options for the majority of fractures [22].

The prospective study found important advantages with locked nailing compared to plate

**DISCUSSION**

Table 6: Secondary Surgical Procedures

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Implant Removal</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Deploiture</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ref of Fixation</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>PlaTE</td>
<td></td>
</tr>
</tbody>
</table>

Secondary procedures done to remedy these complications.

Implant removal was done in two patients in the nailing group and was subcondral
fracture site; two cases had better communication in the plate group.

Because of the fractures related by malunion the patients had further communication at
distraction was in the range of 5mm and had no adverse effect on the healing of the
Overdistraction at the fracture site occurred in two patients treated with nailing. This
The closeess of the real
shoulder motion is correct operative technique, is not a factor that affects the functional results of shoulder motion. The use of shoulder motion is performed in the absence of shoulder function. Patients who have undergone an arthroplasty operation for shoulder pain are found in this study. Patients who were placed shoulder pain and closer to operative technique. A key to premature improvement of shoulder function is not a factor that affects the functional results of shoulder motion. It is the one concern that is not done. The comparison of distraction of the arthroplasty patient. The author has chosen arthroplasty as the choice of distraction for this study.

As for finding the author has chosen arthroplasty as the choice of distraction for this study.
advantage of fixation is that once the limb is stabilised it can be mobilized early without
sequestrum formation, swelling, oedema and associated neurological injuries [35]. The
incomplete reduction, delayed humeral fractures, multiple fractures, open fractures,
internal fixation is indicated following failure to maintain satisfactory alignment.
and difficult to achieve satisfactory union to function [32]. If should be noted that most authors have
succeeded in obtaining a satisfactory union to function [32]. They had a rate of union in closed fractures of 98% in all
patients by anatomical realignment [32]. The rationale of non-operative treatment largely stems from work done
controversial [31]. The rationale of non-operative treatment largely stems from work done.
In summary the treatment of fractures of the shaft of the humerus remains

and operation time was recorded in two randomized controlled studies [6, 8] compared to the union group (160 of 250 and see ref. 7). Mean hospital stay, blood loss
compared to the humeral shaft group was greater in the plate group. Blood loss was greater in the plate group,
and their fractures were completely healed. Operating time and blood loss was not the
health. It was also observed that patients with pain at six months were fully recovered
this study overestimation of the radiographs was used to control various stages of fracture
compares well with international studies. The problem is how to quantify non-union in
10% [31]. My study has shown a nonunion rate of 11% in the plate group (3 of 22). This
comprises plate (DCP) fixation, the incidence of non-union has ranged from 2 to
in importance time to union and other outcomes [32]. In regards of dynamite
Nonunion is the pressing problem on every orthopaedic surgeon mind. Calcium should be

permanent damage is generally rare, but transient neuropathies still occurs.
potential risk of nerve injury but with improved surgical techniques and more experience,
nerve to the humeral shaft and the necessary to dissect the radial nerve in placing has a
Support the idea that ultrasound might, when carried out correctly, be the case of
definitive leap of the zone head poorly. Following strict examination, many reports
problem with muscle. Studies have shown this area to be hypoactive, and that even
cortical zone in the head, which is believed to have a poor blood supply, leading to
head is needed to gain access for insertion of the hamstring nail. This is near the so-called
communication, and gaps at times are greater than prior insertion into the supraspinatus
repair, prominence of the nail or the locking screws, already have limited
thought to cause poor recovery include massive tears of the rotator cuff with immediate
contributing to the problems in the shoulder joint. Other less common factors which are
Most authors have considered improvement of the rotator cuff as more important factor
of the shoulder was similar in both groups [8].
of T2MN with dynamic compression plating in a series of 47 patients and found that
main reason for residual problems in the shoulder joint, Charnley et al compared the use
Il has been suggested that injury to the rotator cuff during insertion of the nail is not the
scores and objective measurements showed no difference between groups [17].
42 patients treated with autografting and 47 [20] who performed properly shoulder
(23), Lin and Moon reported good functional outcomes in a retrospective study of a group of
range of motion between nulling and plating in a prospective randomized randomizedstudy
McGowan et al [38] found no difference in shoulder and elbow scores, shoulder pain or
prevented.
Additionally, the greater deficit is often seen with conservative treatment in the supine position.
external support and allows the patient the comfort of sleeping in the supine position.
mostly supported with only one case development deep sided injection.

10.4 weeks [6, 8] injection was more common in the control group at 11.1% (27/247) while it was
was noted than in the manual group it was 6.2 to 9.8 weeks and in the plane group it was 8.9 to
This was compared to different pooled studies which correlated with our findings and in
which was 2.64 weeks for the null group as compared to the plane group with 9.2 weeks.

July 07 to 16.0% [6, 8]. These figures correlate with our study. In our study the time to
poole studies contained patients with non-motion [6, 7] and injections were

study time were these cases of intraarticular nerve injury and three cases of resection. In
involved the median nerve [10, 11] and second was motion [3, 9] of the patients. In our

The most common of the complications was noted in the plane group post-operatively and
Two complications were much higher in the plane group as compared to the null group.
The difference when compared after six months in both groups.

The plane group [7.5% points] [The modified Conzemius score did not show significant
HSS showed more and a higher average score for the null [16.5 points] as compared against
who were older than fifty five years had more pain during the rehabilitation period. The
when the WOMAC score to assess pain due to osteoarthritis it was shown that patients
    We used three scoring systems to assess shoulder and elbow function postoperatively.

Painful response for further comparison.

Signs of the rotator cuff in patients with humeral head retroversion high resolution ultrasonography

Dissection. Therefore further investigation is required to evaluate the proce desperate

Improvement is a multi-factorial problem and IKN is not the sole cause of shoulder

Injuries et al indicate the cause of arthroscopic by the introduction of the null. Shoulder
Improvement of shoulder function. Insertion of the null through an already compromised
Clinical and Recommendations

Sound conclusions:

Published studies have similar number of patients and have been able to draw statistically
relevant results from the hospital. The number of patients in the study is not great but many
in some cases follow-up was difficult because some of our patients were unemployed or

Limitations of study:

From the part E Chapter 120:

The conclusions are similar to other studies. This study is equal to studies published
on other points towards the use of an intraocular lens by having better outcomes.

The results of this study are comparable with other studies, but the difference in mode of

Comparison of results with published data:

shows the possibilities for a successful outcome.

Until direction measurement technique, good quality hardwear, and stable transplanting
invasive surgical technique gave more favourable results than the plate fixation. Correct

In this prospective study of some humeral fractures, humeral locked nails with their less
or magnetic resonance to confirm that it is not influenced during inspection of the hall.

The results of these studies were presented at the Joint Meeting of the American College of Radiology and the American Society of Neuroradiology in 1982. This work demonstrated that MRI is a valuable tool for the diagnosis of intracranial masses.

In summary, MRI has become an indispensable tool in the evaluation of intracranial masses. Its ability to provide detailed images of the brain has revolutionized the field of neuroimaging. Further research is needed to fully understand the potential applications of MRI in this area.
REFERENCES

Wexler, MS, Levesque, F, & Hughes, JL. Fractures of the elbow. In目前国内解剖教材.


Wexler, MS, Patterson, MB, & Whelan, TH. The complications of elbow fracture. In目前国内解剖教材.


Patterson, MB, & Whelan, TH. The complications of elbow fracture. In目前国内解剖教材.


Solomon, L, Waterk, D, & Nafziger, S. A System of Orthopadics and

Scheel, L.R. & Smith, J.D. Functional breathing of patients on the

shelf of the human.

55
The protocol and study forms are included for reference.
The study.

Recruit how you do after the operation. Everyone else will be excluded.

This will be the main test, the only experimental aspect of the study. All we will need your help in this study. We are interested in understanding single vision of humans in the context of follow-up visits documented and recorded for future analysis. Please note that these follow-up visits have been discussed with us. Unless you can come back for a checkup and X-rays after 3 weeks. 6 months or 1 year. This data will be used to improve the overall understanding of the implications mentioned above. After each follow-up appointment, we will ask you to come back for a checkup and X-rays. We have been Alberta Health Services. We would like you to follow up in the study.

What do we expect from the participants in the study? Patients who need a second clinical examination of their lenses and agree to participate in the study are considered participants in the study.

AppendIX a

Introduction Sheet and Consent Form
Please extract the following two methods of fixation: locked intramedullary nailing versus prospective randomized study of outcomes in patients with humeral shaft fracture. I agree to participate in the study.

Consent Form

[Signature]

Date:
Witness:
[Signature]

Thank you,

Dr. Zain Peer

If you agree to participate in this study, please sign the consent form below.

If you have any queries, more information may be obtained from Isabela et al. telephone number (011) 499 6363.

In lieu of withdrawing from the study without giving a reason, Remember that the study is voluntary and not taking part in it or withdrawing from it, carries no penalty of any sort.

May participants withdraw from the study? Certainly, you may do so at anytime.

85
1. Exchange implant refers to an implant removal and exchange with another implant with or without bone graft.
2. Exchange of implant with or without bone graft.
3. Implant failure refers to a mechanical failure e.g. screw pullout, bent retention of the implants.
4. Revision refers to any local surgical procedure, with or without complication refers to any adverse effect with or without reparation.

Date entry on: ____________________________

By: ____________________________

Exchange implant: **Yes** / **No**

Complication: **Yes** / **No**

Revision: **Yes** / **No**

Other:


O: Failure of implant) O: Failure (reduction) O: Failure (conclusion)

B: Exchange (replacement) O: Loss to FU O: Dead

ARCHIVING: O: On file O: BT: Last to FU O: BT: Dead

NAT: mm x mm x mm

DEC: mm

CONF: mm

SYSTEM: OAO UHN
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<td>6</td>
</tr>
<tr>
<td>Up to shoulder</td>
<td>4</td>
</tr>
<tr>
<td>Up to waist</td>
<td>2</td>
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</tbody>
</table>

**Positioning**

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<table>
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<tbody>
<tr>
<td>Unobstructed sleep</td>
<td>2</td>
</tr>
<tr>
<td>Full recumbent / supine</td>
<td>4</td>
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<tr>
<td>Full work</td>
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**Activity Level**

**Activities of Daily Living**

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<td>None</td>
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<td>Mild</td>
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**Pain**

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<tr>
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<th>Right</th>
<th>O</th>
<th>Score</th>
</tr>
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<td>Left</td>
<td>Right</td>
<td>O</td>
<td>Score</td>
</tr>
<tr>
<td>Side</td>
<td>Left</td>
<td>Right</td>
<td>O</td>
<td>Score</td>
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**Date or Surgery (dd/mm/yy):**

**Date of Procedure:**

**Phone:**

**Reviewer:**

**Note:**

---

**CONSTANT SCORE (1/2)**

---

Appendix C
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<td>11-20</td>
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<td>21-40</td>
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<tr>
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<tr>
<td>2</td>
<td>61-80</td>
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<tr>
<td>0</td>
<td>81-180</td>
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<td>61-80</td>
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<td>81-180</td>
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<td>Above head</td>
</tr>
<tr>
<td>8</td>
<td>Up to top of head</td>
</tr>
<tr>
<td>Points</td>
<td>Finding</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
</tr>
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<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

(6) deformity: 2 measures (flexion, concentric, extension concentric)
(4) range of motion: 2 measures (extension, protraction, abduction)
(5) muscle strength: 1 measure
(2) function and activities: 2 measures (bending activities, elbow use)
(1) pain: 2 measures (pain at rest, pain when bending)
Notes

- The higher the score, the better the elbow function.
- Maximum score: 100
- Minimum score: 0

<table>
<thead>
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<td>15° &lt;</td>
</tr>
<tr>
<td>2</td>
<td>15° to 30° &lt;</td>
</tr>
<tr>
<td>3</td>
<td>30° to 60° &lt;</td>
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<tr>
<td>4</td>
<td>60° &lt;</td>
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<tr>
<td>5</td>
<td>Supination</td>
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<td>0° &lt;</td>
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<td>7</td>
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<td>Abnormal gravity</td>
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</tr>
<tr>
<td>24</td>
<td>0° to 6°</td>
</tr>
<tr>
<td>25</td>
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</tr>
<tr>
<td>26</td>
<td>15° to 45°</td>
</tr>
<tr>
<td>27</td>
<td>45° to 60°</td>
</tr>
<tr>
<td>28</td>
<td>60° to 90°</td>
</tr>
<tr>
<td>29</td>
<td>90° &gt;</td>
</tr>
<tr>
<td>30</td>
<td>Flexion strength</td>
</tr>
<tr>
<td>31</td>
<td>2.3 kg &lt;</td>
</tr>
<tr>
<td>32</td>
<td>2.3 kg to 90°</td>
</tr>
<tr>
<td>33</td>
<td>90°</td>
</tr>
<tr>
<td>34</td>
<td>Flexion strength</td>
</tr>
<tr>
<td>35</td>
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</tr>
<tr>
<td>36</td>
<td>2.3 kg to 90°</td>
</tr>
<tr>
<td>37</td>
<td>90° &gt;</td>
</tr>
<tr>
<td>38</td>
<td>Flexion strength</td>
</tr>
<tr>
<td>39</td>
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</tr>
<tr>
<td>40</td>
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</tr>
<tr>
<td>41</td>
<td>90° &gt;</td>
</tr>
<tr>
<td>42</td>
<td>Flexion strength</td>
</tr>
<tr>
<td>43</td>
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</tr>
<tr>
<td>44</td>
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</tr>
<tr>
<td>45</td>
<td>90° &gt;</td>
</tr>
<tr>
<td>46</td>
<td>Flexion strength</td>
</tr>
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</tr>
<tr>
<td>48</td>
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</tr>
<tr>
<td>49</td>
<td>90° &gt;</td>
</tr>
<tr>
<td>50</td>
<td>Flexion strength</td>
</tr>
<tr>
<td>51</td>
<td>2.3 kg</td>
</tr>
<tr>
<td>52</td>
<td>2.3 kg to 90°</td>
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<tr>
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<tr>
<td>54</td>
<td>Flexion strength</td>
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<td>2.3 kg</td>
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<tr>
<td>56</td>
<td>2.3 kg to 90°</td>
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<tr>
<td>75</td>
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</tr>
<tr>
<td>76</td>
<td>2.3 kg to 90°</td>
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<tr>
<td>77</td>
<td>90° &gt;</td>
</tr>
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<td>Flexion strength</td>
</tr>
<tr>
<td>79</td>
<td>2.3 kg</td>
</tr>
<tr>
<td>80</td>
<td>2.3 kg to 90°</td>
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<tr>
<td>81</td>
<td>90° &gt;</td>
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<tr>
<td>82</td>
<td>Flexion strength</td>
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<tr>
<td>83</td>
<td>2.3 kg</td>
</tr>
<tr>
<td>84</td>
<td>2.3 kg to 90°</td>
</tr>
<tr>
<td>85</td>
<td>90° &gt;</td>
</tr>
<tr>
<td>86</td>
<td>Flexion strength</td>
</tr>
<tr>
<td>87</td>
<td>2.3 kg</td>
</tr>
<tr>
<td>88</td>
<td>2.3 kg to 90°</td>
</tr>
<tr>
<td>89</td>
<td>90° &gt;</td>
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<tr>
<td>90</td>
<td>Flexion strength</td>
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<tr>
<td>91</td>
<td>2.3 kg</td>
</tr>
<tr>
<td>92</td>
<td>2.3 kg to 90°</td>
</tr>
<tr>
<td>93</td>
<td>90° &gt;</td>
</tr>
<tr>
<td>94</td>
<td>Flexion strength</td>
</tr>
<tr>
<td>95</td>
<td>2.3 kg</td>
</tr>
<tr>
<td>96</td>
<td>2.3 kg to 90°</td>
</tr>
<tr>
<td>97</td>
<td>90° &gt;</td>
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<tr>
<td>98</td>
<td>Flexion strength</td>
</tr>
<tr>
<td>99</td>
<td>2.3 kg</td>
</tr>
<tr>
<td>100</td>
<td>2.3 kg to 90°</td>
</tr>
</tbody>
</table>
1. How much pain do you have on a scale of 0 to 10? (0 = none, 10 = incapacitating)

2. When did you first notice pain?

3. What kind of pain is it? (e.g., sharp, dull, constant, intermittent)

4. What activities exacerbate your pain?

5. What activities do you avoid due to pain?

6. How severe is your stiffness after resting in the morning?

7. How severe is your stiffness after standing upright?

8. How severe is your stiffness at night while in bed?

9. How severe is your stiffness when getting up or down stairs?

10. How severe is your stiffness when walking on a flat surface?

The 12 questions concern the amount of pain you are currently experiencing.

Worse: Score FWS; Better: Score Reduced

FWS: 0 0 0 0 0 0 0 0 0 0 0 0

Reduced at 0 3 6 9 12 18

Weeks

Appendix E
NOTES

0 None  O Mild  O Moderate  O Severe
24.1.7th domestic duties:
  O None  O Mild  O Moderate  O Severe
23. Heavy domestic duties:
  O None  O Mild  O Moderate  O Severe
22. Getting on/off toilet:
  O None  O Mild  O Moderate  O Severe
21. Entering into/out of bath:
  O None  O Mild  O Moderate  O Severe
19. Lying in bed:
  O None  O Mild  O Moderate  O Severe
18. Treading on socks/stockings:
  O None  O Mild  O Moderate  O Severe
17. (17) Rising from bed:
  O None  O Mild  O Moderate  O Severe
16. (16) Putting on socks/stockings:
  O None  O Mild  O Moderate  O Severe
15. Going shopping:
  O None  O Mild  O Moderate  O Severe
14. (13) Getting out of car:
  O None  O Mild  O Moderate  O Severe
13. (8) Walking on floor:
  O None  O Mild  O Moderate  O Severe
12. Bending to floor:
  O None  O Mild  O Moderate  O Severe
11. Standing:
  O None  O Mild  O Moderate  O Severe
10. (9) Raising from sitting:
  O None  O Mild  O Moderate  O Severe
  9. (6) Ascending stairs:
  O None  O Mild  O Moderate  O Severe
8. Descending stairs:
  O None  O Mild  O Moderate  O Severe
7. How severe is your stiffness after sitting, lying or resting later in the day?

When dealing with difficulty do you have with...

Please indicate the degree of difficulty you are experiencing due to arthritis.

For each of the following activities, please rate yourself after you are able to move around and do your tasks.

Note: These questions concern your physical function by this we mean your ability to function physically. If you have difficulty or pain, please rate the degree of difficulty you are experiencing due to arthritis.

24. 7th domestic duties:
  O None  O Mild  O Moderate  O Severe
23. Heavy domestic duties:
  O None  O Mild  O Moderate  O Severe
22. Getting on/off toilet:
  O None  O Mild  O Moderate  O Severe
21. Entering into/out of bath:
  O None  O Mild  O Moderate  O Severe
19. Lying in bed:
  O None  O Mild  O Moderate  O Severe
18. Treading on socks/stockings:
  O None  O Mild  O Moderate  O Severe
17. (17) Rising from bed:
  O None  O Mild  O Moderate  O Severe
16. (16) Putting on socks/stockings:
  O None  O Mild  O Moderate  O Severe
15. Going shopping:
  O None  O Mild  O Moderate  O Severe
14. (13) Getting out of car:
  O None  O Mild  O Moderate  O Severe
13. (8) Walking on floor:
  O None  O Mild  O Moderate  O Severe
12. Bending to floor:
  O None  O Mild  O Moderate  O Severe
11. Standing:
  O None  O Mild  O Moderate  O Severe
10. (9) Raising from sitting:
  O None  O Mild  O Moderate  O Severe
  9. (6) Ascending stairs:
  O None  O Mild  O Moderate  O Severe
8. Descending stairs:
  O None  O Mild  O Moderate  O Severe
7. How severe is your stiffness after sitting, lying or resting later in the day?

0 None  O Mild  O Moderate  O Severe

...