s.com, for detailed information on physiotherapy books, visit our website www.jaypeebrothers.com, for detailed information on physiotherapy books

# MANIPULATIVE PHYSIOTHERAPY

## *Assessment, Treatment and Improvisation*





**Amrit Biswas**

*Foreword*
**Amitabh Biswas**

JAYPEE

# Contents


## Chapter 1

**Introduction and History of Manual Therapy** **1–3**

## Chapter 2

**Assessment, Background, Subjective, Physical and Principles of Examination** **4–254**

Background 4

Subjective examination 8

Physical examination – on observation 18

Background and principles 21

Explanation of the modification strategies 25

2.1. Physical examination techniques for shoulder joint 32

2.2. Physical examination techniques for elbow joint 44

2.3. Physical examination techniques for wrist and hand 53

2.4. Physical examination techniques for hip joint 70

2.5. Physical examination techniques of knee joint 82

2.6. Physical examination techniques of ankle and foot 96

2.7. Physical examination of pelvis 109

2.8. Physical examination of lumbar spine 121

2.9. Physical examination of thoracic spine and rib cage 131

2.10. Physical examination of cervical spine 140

2.11. Physical examination of temporomandibular joint 160

2.12. Physical examination of muscles and other soft tissues 165

2.13. Physical examination of nervous system 187

2.14. Examination of pain 218

2.15. Examination for structural differentiation 232

2.16. Putting it all together: evaluation, philosophy, reasoning and interpretation 237

Appendix I 239

Appendix II 252

## Chapter 3

**Treatment Techniques: Joint Function, Dysfunction and Treatment Principles** **255–479**

3.1. Joint function, dysfunction and treatment principles 255
3.2. Treatment techniques for shoulder joint dysfunction 276
3.3. Treatment techniques for elbow joint dysfunction 290
3.4. Treatment techniques for wrist and hand joint dysfunctions 301
3.5. Treatment techniques for hip joint dysfunction 325
3.6. Treatment techniques for knee joint dysfunction 333
Appendix 349
3.7. Treatment techniques for ankle and foot joint dysfunctions 350
3.8. Treatment techniques for pelvis dysfunction 369
3.9. Treatment techniques for lumbar spine 381
3.10. Treatment techniques for thoracic spine and rib cage 393
3.11. Treatment techniques for cervical spine 408
3.12. Treatment techniques for temporomandibular joint 429
3.13. Muscles and other soft tissue function and dysfunction 434
3.14. Muscles and other soft tissue treatment principles and techniques 451
3.15. Peripheral nerves function and dysfunction 461
3.16. Peripheral nerves treatment principles and techniques 470

## Chapter 4

**Improvisation: Beyond Philosophies and Techniques** **480–483**

*Index* *485*

CHATPER

# 2

# *Assessment, Background, Subjective, Physical and Principles of Examination*

## BACKGROUND

### What is an Assessment, its Meaning and its Importance?

The word 'assessment' is mainly used with two meanings in literature. One meaning is examination and the other meaning is evaluation. Examination either subjective or physical is a process of gathering information about the patient and her symptoms. Whereas evaluation is a thought process of the therapist about—What he is doing, why he is doing so, how justified, suitable, rational, effective and logical the processes are? These two processes generally go together. One refines the other. For example, thought A may force the therapist to do test B or question B. If the findings of question B or test B support thought A, then thought A may be formulated as hypothesis A. In case the findings from test B or question B do not support thought A, then the therapist must consider either modifying thought A or a new thought C should emerge. Again the thought C must be confirmed by question D or test D to make it hypothesis D. The word assessment can be used to describe the total process of examination and evaluation (Fig. 2.1).

In this text to avoid further confusion, instead of word 'assessment' either the word 'examination' or the word 'evaluation' will be used to denote the specific meanings. The word 'assessment' will mean the total process of examination and evaluation.

The importance of assessment just cannot be stressed by saying that "it is important". It is the keystone of any successful and effective physiotherapy treatment. A wrong assessment will lead to wrong hypothesis generation and subsequently it will lead to either wrong treatment or less effective treatment.

The accuracy of examination process is also important from another perspective. We, human beings are all different from each other. No two human beings are identically same. In the light of this fact when we consider any sign and symptom, it has different meaning to every individual. Difference in individual human characteristics and traits along with pain experiences and associated believes make every sign and symptom unique. Hence the examination and treatment procedure must be individualized. All small, subtle variations with all possible minute details must be recorded and taken care of. Without this individualization

JAYPEE BROTHERS

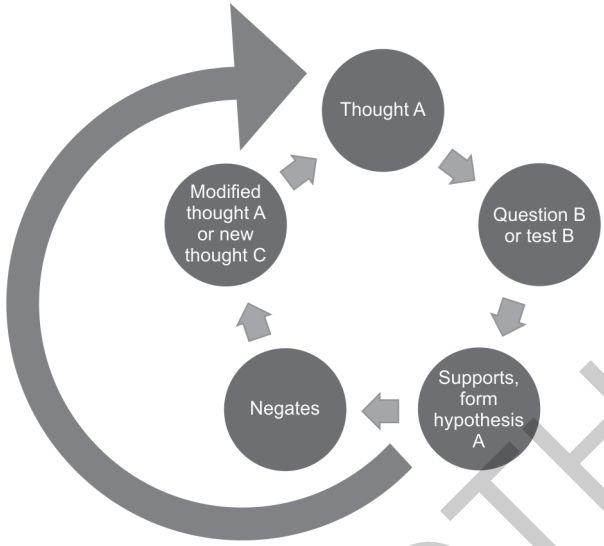



**Figure 2.1**: Interrelation of thought and actions

the treatment become stereotype and looses its effectiveness. This is an unseen philosophy of manual therapy.

## Types of Evaluation

Evaluation is a continuous process. It starts from the very first time the patient comes in and it continues upto the completion of the treatment. All these evaluations done at different time during the entire treatment process continuously changes the treatment procedures and associated thought of the therapist. The evaluations, as done in conjunction with examinations, either as a result of examination or treatment techniques, or the examination and treatment techniques are the result of the evaluation as an ongoing process. Hence they can also be termed as assessment.

*The evaluations done in the course of the treatment are as follows* (Fig. 2.2)—

1. After the initial examination
2. At the beginning of each treatment session
3. During the performance of each treatment techniques
4. After each technique is performed
5. At the completion of a single treatment session
6. At the next treatment session with emphasize on the last 24 hours after last treatment.
7. As a retrospective procedure—
   a. To confirm the real improvements as a result of the treatment
   b. To find the reason behind any delay or stop in the rate of progression
   c. To explore the scope of spontaneous recovery
   d. To rethink about the goal of the treatment as in many cases the initially decided goal may not be achievable
8. Analytical assessment after the completion of the entire treatment—
   a. To decide the prognosis
   b. To determine the prophylaxis
   c. To determine any new recognizable pattern of illness behavior (signs and symptoms).

JAYPEE BROTHERS

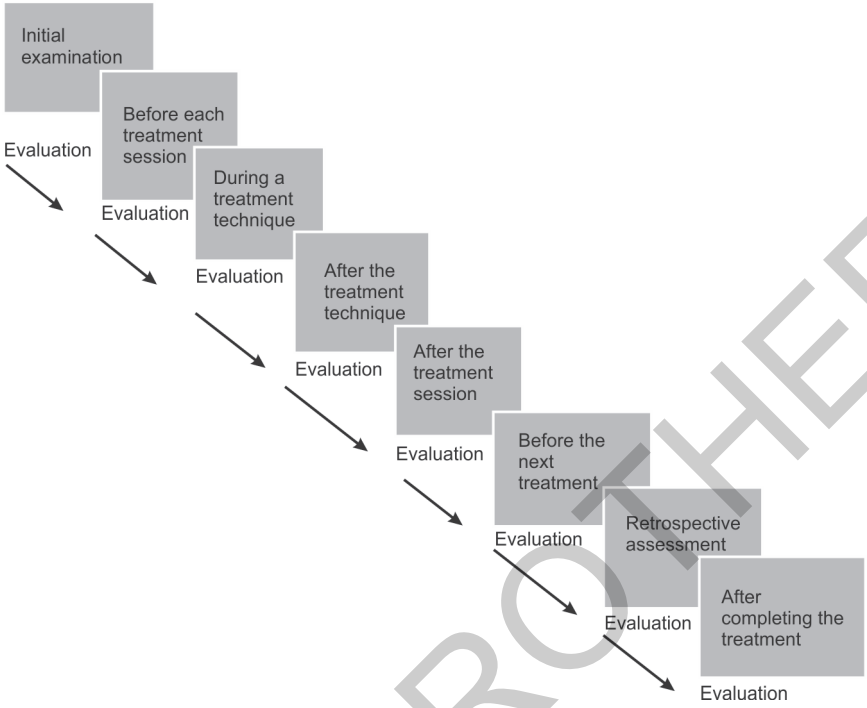



**Figure 2.2**: Treatment progression, stages, and evaluations

## Nature of Subjective and Physical Examination

Information or data can be of two types. One is qualitative data, which cannot be measured in any standard scale. Though, Likert type of scale can be formulated for qualitative data. But the reliability (intertester; between two examiner measuring the same thing and intratester; the same examiner measuring the same thing but in two different occasions) of the results and validity (is what been measured is the intended one for which the scale been created) of the results are not beyond questions. For example, patient's belief, pain meaning, history which had took place in past, experience of the illness, improvements form treatment procedures, etc.

On the other hand is quantitative data, which can be measured and expressed in standard values. For example, range of motion, a special test outcome.

In subjective examination, we try to gather information about the first said data, whereas in physical examination we gather the second types of data. It must be clear now that during subjective examination we need more communication skill, interaction skill to extract out the right information from our patients. In physical examination, we need more hands on skill to do a procedure exactly to get an answer. It must be remembered that evaluation (thinking) is a continuous process which keep on working throughout the subjective and physical examination.

## What to be Looked for in Examination?

During the entire process of subjective and physical examination, certain key points must be noted. All the information gathered

JAYPEE BROTHERS

by these two examination procedure must try to answer the following key points. Any point considered as very important during the subjective and physical examination must be marked with an asterisk (*). This helps the therapist to compare the results after treatment to determine progress.

**1. What structures are at fault?**

a. Joints and/or structures around a joint like ligament, capsule, intra-articular structures like menisci, intra-articular disk, ongoing intra-articular inflammation, and degeneration.
b. Other soft tissues like muscle, tendon, bursa, and fascia.
c. Peripheral nerves due to adhesion, bleeding, entrapment, extraneural, perineural and intraneural pathology.

**2. What is the stage of the disorder?**

a. The frequency of the attack.
b. The symptoms are localizing or spreading.
c. In the light of inflammation and its stages, where do the present signs and symptoms sit?

**3. How stable the disorder is?**

a. How easily the present signs and symptoms came on?
b. Were there any predisposing factors?

**4. Factors affecting the behavior and course of the disease.**

a. How was the onset?
b. Age, general health, gender, occupation, and family history.

**5. How the 'structures at fault' became faulty?**

a. Trauma
b. Disease and inflammation
c. Degeneration
d. Misuse, disuse, overuse, new use, abuse of joints, muscles and other soft tissues and peripheral nerves.

**6. What is the underlying pain mechanism for symptom production?**

a. Nociceptive pain
   i. Mechanical
   ii. Inflammatory
   iii. ischemic.
b. Peripheral neurogenic pain
c. Centrally mediated pain
d. Autonomic pain
e. Affective pain.

**7. What is the patient's perspective about her problem?**

a. Environmental perspective
b. Behavioral perspective
c. Emotional perspective
d. Psychosocial perspective.

### Relation Between Assessment and Treatment (Fig. 2.3)

Assessment and treatment procedures cannot be viewed separately. Any assessment procedure which eases or reproduce the symptoms may be used as a treatment technique. The choice of symptom reproduction or easing depends on the severity and irritability of the symptom. A severe and irritable symptom should not be reproduced much. If the symptom is not so, then symptom reproduction can be done. By judging the effect of any assessment technique by various evaluations, if it is found to be beneficial then certainly that particular technique has a role in treatment. Similarly if a treatment technique gives an important cue about patient's signs and symptoms then it had played some role in assessment. This is another unseen philosophy of manual therapy.

Now in the following chapters of assessment, we will explore the entire subjective and physical examinations of joints, muscles and other soft tissues, and peripheral nerves with structural differentiation and pain assessment along

JAYPEE BROTHERS

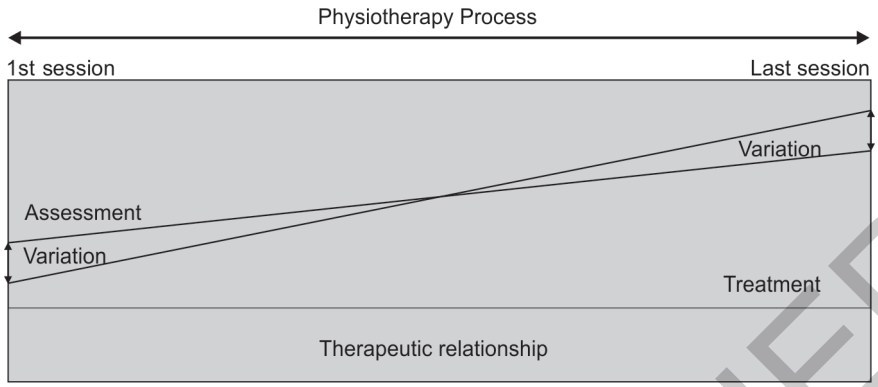



**Figure 2.3**: Relation between assessment and treatment

with the meaning of the findings, their logic, interpretation and the reasoning required to do so.

## SUBJECTIVE EXAMINATION

As already mentioned in the last chapter, in subjective examination we sought for qualitative data and that requires more communication and interaction skill to extract the right information, at the beginning of this chapter we will briefly explore the skills required to do so and some common errors involved in this procedure. For more detailed description the reader is referred to Maitland's vertebral manipulation and peripheral manipulation books.

It is a fact that clinical presentation of illnesses not always follows the textbook patterns. Sometimes it is easy to identify the illness but sometimes it is difficult because the clinical presentation of illness do not follow the textbook pattern. To understand these differences between clinical presentation of any illness and theoretical textbook knowledge the 'semipermeable brick wall concept' of Maitland must be understood (Fig. 2.4).

As per this concept information on the right hand side are always true. It is the clinician's responsibility to understand the meaning of them in the light of the factors mentioned on the left hand side. There are some instances where the 'brick' is not there, the information of both sides match perfectly. Clinician can easily identify the illness of the patient. But when the 'brick' blocks the perfect match between the right and left hand side, (which is fairly common) the clinical dilemma begins.

To deal with such situations Maitland had proposed the idea of 'making features fit'. It is nothing but the inquisitive and penetrating questions and their analysis with critical (analytical) thought by the clinician to make the patients unmatched symptoms fit with the clinicians known illness pattern. Though, it may not be possible to fit them all the time. If so, then a new pattern emerges and that enrich the clinician only for later. It is indeed up to the clinician that how much information he wants to look for to make the features fit. Removing the 'bottleneck' (that is not being open-minded with limited knowledge base) in clinicians thought and knowledge to identify and accept various types of patients symptoms is also clinician's responsibility and hence the process of lifelong learning and evidence-based practice.

JAYPEE BROTHERS

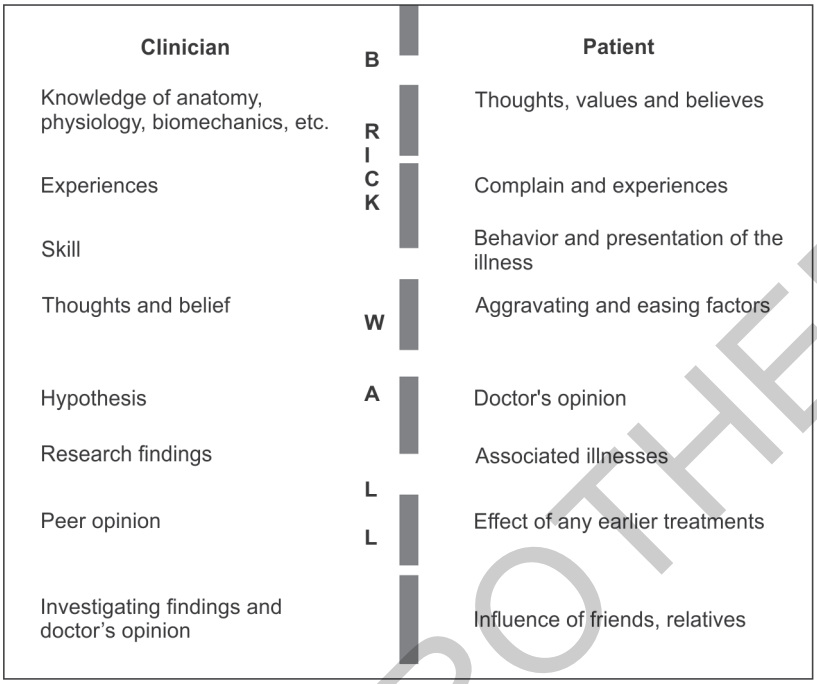



**Figure 2.4**: Semipermeable brick wall concept of Maitland

Often it is believed by the physiotherapy students and practitioners that manual therapy practice is about learning the techniques and concepts like Maitland, McKenzie, Mulligan, Cyriax, Butler, etc. unfortunately at the time of learning the 'concept' part is commonly missed out. There are many techniques which can be performed on a specific condition or situation. But just knowing the techniques without their underlying philosophy make them ineffective. This is because the student cannot understand the followings—

- What is the preferred technique over another?
- Why the preferred one is 'preferred'?
- How the technique is going to affect the patients symptoms that is, what is the prognostic value of that technique?
- When and on whom to apply the technique, that is screening out the contraindications and precautions.
- Who is the right person to apply it that is confidence and skill of the practitioner.

There has been many techniques in past and new techniques will emerge in future too. Attending a workshop on these techniques will enhance the skill, only when the attendee knows the meaning of these techniques. Without that the attendee will not have the confidence to use them on patients and hence due to lack of practice they will be soon forgotten.

The only way to answer these questions is by examining and analytical evaluation. This is the true importance of assessment. Here comes the role of communication and interaction skills to extract the right information from the patient. The common errors in communication are described in Figure 2.5.

The aim of the subjective examination is to develop the following hypothesis

JAYPEE BROTHERS

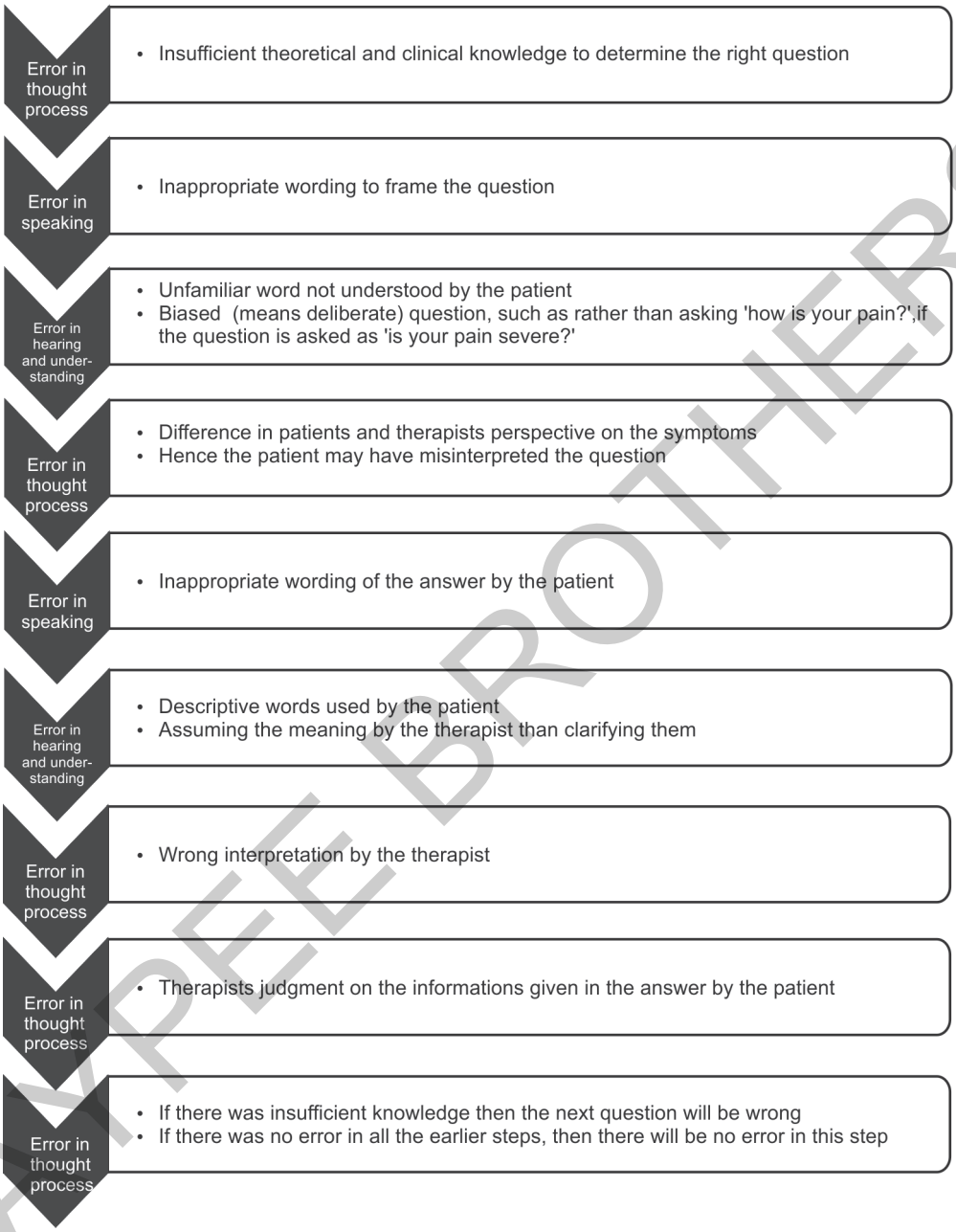



**Figure 2.5**: Common errors in communication

(probable answers) by the end of the subjective examination.

1. Patient's abilities and inabilities.
2. Patient's perspectives on their problem.
3. Structures at fault, which includes the

JAYPEE BROTHERS

area/s, its state of healing and probable pain producing mechanism.

4. Contributing factors which might have been responsible to produce the symptoms.
5. Any underlying precautions and/or contraindications.
6. Management strategy and treatment plan.
7. Prognosis, including time frame and expected recovery.

The information gained during subjective examination is used to answer the above questions. To do so a systematic approach to subjective examination need to be followed. The summary of the subjective examination is given in Table 2.1.

### Body Chart (Fig. 2.6)

It is a useful and quick measure to gain information about patient's symptoms. It is important to remind at this stage that pain is not the only symptom. The whole spectrum of symptoms in movement-related disorders could be pain, stiffness, paresthesia, giving way, instability, weakness and loss of function. A body chart should clearly depict all the symptoms, in all over the body with any existing relations between them. Any area which is symptom-free must be cleared by a '√' (right) mark. A body chart with imaginary symptoms and interrelations between them is shown later in this book under the last topic of assessment 'putting it all together'. The marked areas on body chart are known

**Table 2.1**: Summary of subjective examination

| Procedures | Information |
|---|---|
| • Body chart | • Type, area, depth, quality of each symptom<br>• Presence of abnormal sensations<br>• Relation between symptoms |
| • Behavior of symptoms | • Aggravating and relieving factors<br>• SIN (severity, irritability and nature) factor<br>• 24 hours pattern<br>• Stage of the condition |
| • Special questions | • To exclude any existing contraindications and precautions |
| • History of present condition | • Onset<br>• Changes took place over time |
| • Past medical history | • Underlying medical illnesses<br>• Previous attacks and effect of previous treatments |
| • Social and family history | • Age, gender<br>• Work and home situations<br>• Insurance |

JAYPEE BROTHERS

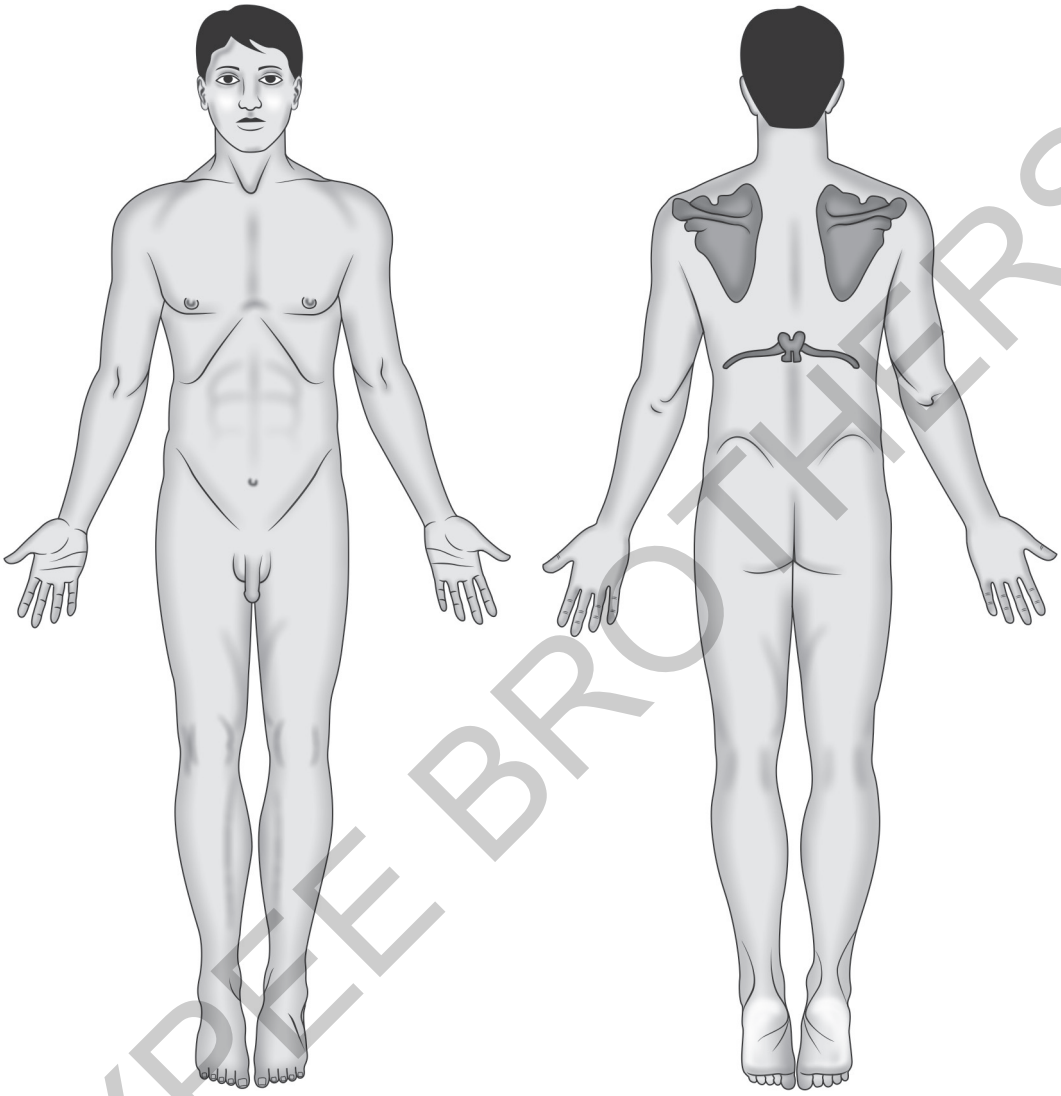
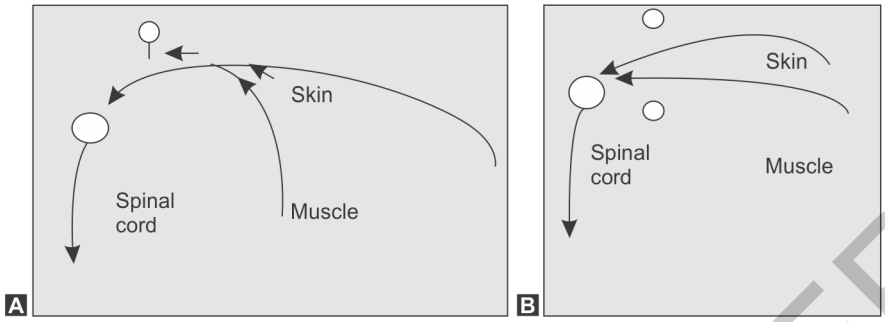


**Figure 2.6**: Body chart

as 'areas of current symptoms', which gives the first impression of symptom distribution. Though the symptoms may be felt over the marked areas on body chart they may actually be emanating from some other areas, which is because of referred pain. Referred pain is simply the pain originating from one area but felt in some other area. Two possible mechanisms for referred pain are peripheral convergence of afferents and convergence of afferents in spinal cord. Figure 2.7 explains both the mechanisms.

The visceral organs also can refer pain in different areas of the body (Fig. 2.8). Further details of referred pain from other structures like joints and soft tissues will be described under specific headings.

JAYPEE BROTHERS




**Figures 2.7 A and B**: (A) Peripheral convergence and (B) Spinal cord level convergence of afferents

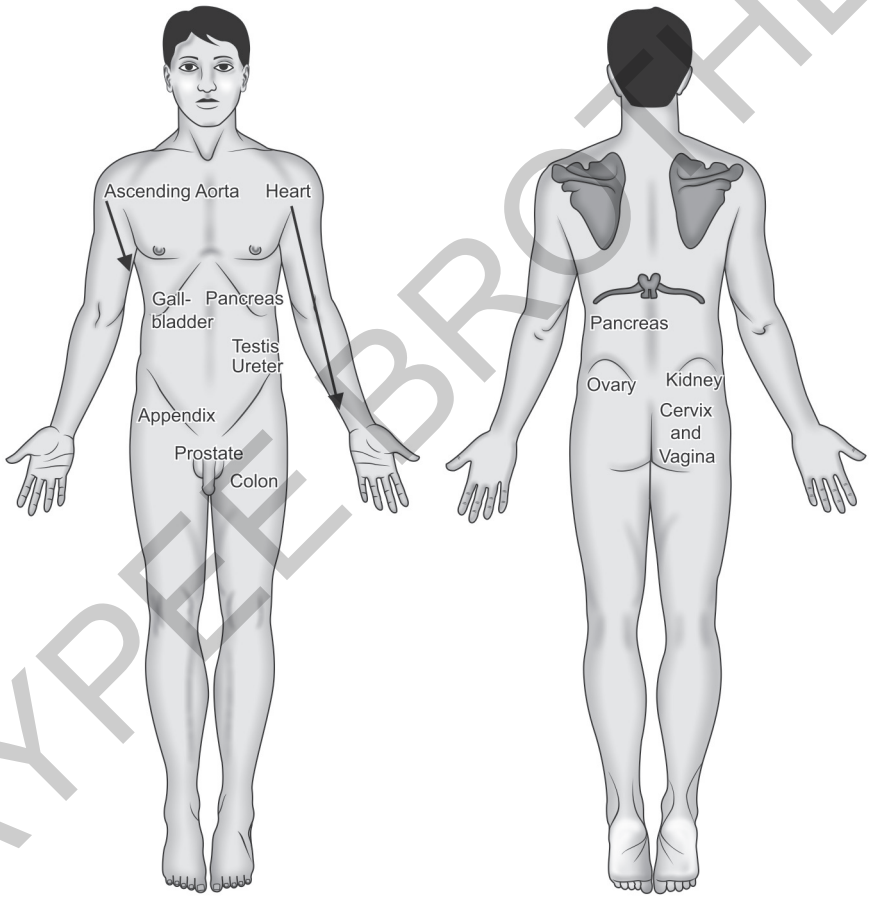



**Figure 2.8**: Pain referral from visceral organ

The next area which needs to be examined is the area/s which is known to radiate pain in the symptomatic area. That is cervicothoracic spine for upper limb and trunk and lumbosacral spine for lower limb. The therapist must inquisitively

JAYPEE BROTHERS

**Table 2.2**: Structures involved and nature of pain

| Structures | Nature of pain |
|---|---|
| • Bone | • Deep, nagging, and dull |
| • Muscle | • Dull ache |
| • Nerve root | • Sharp, shooting |
| • Nerve | • Sharp, lightning-like |
| • Sympathetic nerve | • Burning, pressure-like |
| • Vascular | • Throbbing and diffuse |

ask to confirm any minimal symptoms in these areas, before considering them nonsymptomatic, as patient's often do not mention the mild symptom present in other areas in the body.

Confirm the type of pain by asking it to the patient. Table 2.2 explains it. The details of pain assessment, its types and mechanisms will be covered in a separate chapter later in this book.

Look for the depth and intensity of the pain/s. It might be—

- Mild
- Discomforting
- Distressing
- Horrible
- Excruciating.

Otherwise a VAS (visual analogue scale) may be used. The most common one in use is shown Figure 2.9.

All the abnormal sensations including paresthesia (abnormal sensation), anesthesia (complete loss of sensation), hypoesthesia (reduced touch sensation), hyperesthesia (heightened perception to touch), allodynia (pain provoked by normally nonpainful stimuli), analgesia (absence of pain sensitivity), hypalgesia (reduced pain sensitivity) and hyperalgesia (increased pain sensitivity) should be clearly marked on the body chart.

The nature of symptom/s either constant or intermittent must be confirmed. A constant symptom means that the symptom is felt unremittingly for 24 hours. No position or time is without pain. Any relief from symptoms even for few minutes should categorize the symptom/s as intermittent. On the body chart itself, the relation between symptoms must be established. It is very important as this help to establish links between symptoms. For example, symptom 'A' only appears when symptom 'B' worsens. That shows a possible link between both the symptoms. If symptom 'A' appears irrespective of the appearance of symptom 'B' then there may not be any correlation between them.

## Behavior of Symptoms

In this section of subjective examination the therapist must determine the SIN (severity, irritability and nature) factor of the pain along with aggravating and relieving factors and stage of the condition.

A severe symptom is that, provocation of which forces the patient to stop the

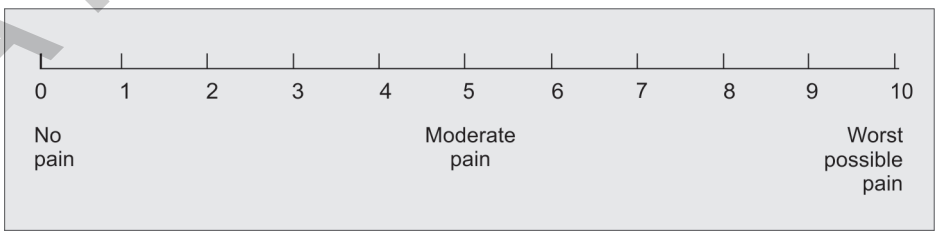



**Figure 2.9**: Visual analogue scale

JAYPEE BROTHERS

movement and to come back to ease it immediately. This is a caution as during physical examination this symptom should not be produced upto its highest extent. An irritable symptom is that which once provoked does not come back to its earlier state immediately after the provocation is withdrawn. It takes 2–3 minutes to settle down. This is also a caution for physical examination. A severe and irritable enough symptom may disrupt patient's sleep at night. A general statement that 'I could not sleep last night due to pain' indicates that the offending symptom may be severe and/or irritable. To determine the nature of the pain, 24 hours pain pattern must be asked. The symptoms may be more at morning, or at evening or at night. This information gives important clues about the nature of the pain. Morning stiffness which eases up with activity indicates inflammatory process. Whereas evening symptoms may indicate more mechanical origin of pain as the workload and exertion throughout the day may predispose the symptoms. Night symptoms are indicative of either infective conditions or postural issues or change in sleeping habits or surfaces. It may also be indicative of some movement limitations as well as some changes in stress on specific structures.

Stage of the condition refers to the status of the symptoms. Deteriorating symptoms, symptoms which are spreading distally will take more time to be cleared off. This is of particular importance for the prognostic value.

Aggravating and relieving factors must be determined at this stage by the therapist. Patient may describe the aggravating and relieving factors by herself. Otherwise the therapist need to perform some aggravating and easing maneuvers or postural alterations known to stress and destress the suspected structures at fault. This help to further decide that how far the suspected structures are actually at fault. Both these factors should be determined for all the symptomatic area and for all the symptoms. Also the effect of aggravating or easing one symptom on the other symptoms should be determined. This further helps to establish relations among symptoms.

## Special Questions

The purpose of these special questions is to take any necessary precautions and to exclude any existing contraindications. Table 2.3 lists the common contraindications and precautions.

**Table 2.3**: Special questions to rule out common contraindications and precautions

| Information | Significance |
|---|---|
| • Active malignant disease | • Contraindication of manual therapy |
| • Hysterectomy and menopause | • Risk of osteoporosis |
| • Recent unexplained weight loss | • Undiagnosed systemic illnesses and/or malignancy |
| • Bone infection | • Bony weakness, prone for pathological fracture |

*Contd...*

JAYPEE BROTHERS

For detailed information on physiotherapy books, visit our website www.jaypeebrothers.com, for detailed information on physiotherapy books, visit ou

# MANIPULATIVE PHYSIOTHERAPY

*Assessment, Treatment and Improvisation*

### *Salient Features*

- The book is all about neuromusculoskeletal physiotherapy.
- Cover the assessment and management with photographs, tables and diagrams.
- Emphasizes on joints, muscles and other soft tissues and peripheral nerves.
- Gives special emphasis to explain the pain mechanisms and recent developments in pain sciences.
- Discusses assessment and management in a systematic approach covering all the joints of human body.
- Explains the scope of modifications within the existing practice in the last chapter.
- Also discusses the functions and dysfunctions of the tissues, and how the clues from those functions and dysfunctions are used during assessment to decide management.
- It is a script of theoretical and clinical practice of neuromusculoskeletal physiotherapy.



**Amrit Biswas** BPT MScPT (UK) C/HmPT MIAP graduated in Physiotherapy from Rajiv Gandhi University of Health Sciences, Bengaluru, Karnataka in 2002. From 2004, he has been associated with teaching undergraduate students of physiotherapy. He completed his MSc in Physiotherapy from University of Brighton, East Sussex, UK in 2008. He has been examiner, evaluator for various universities examination for undergraduate Physiotherapy courses. He also works as a Consultant Physiotherapist in various hospitals and health care setups in Durgapur and vicinity. His career interest is in narrowing down the gap between theoretical knowledge and clinical practice by validating the existing practices in Physiotherapy in the light of ever-new knowledge base by continuous professional upgradation.

**Available at all medical bookstores**
**or buy online at www.jaypeebrothers.com**

JAYPEE BROTHERS
Medical Publishers (P) Ltd.
www.jaypeebrothers.com

Join us on facebook.com/JaypeeMedicalPublishers

Shelving Recommendation
**PHYSIOTHERAPY**

ISBN 978-93-5250-126-7