Tomás Martín López

How to play without pain
Your first instrument is your body

Exercises to prevent and treat injuries in musicians

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Preface

Fortunately, I learned my lesson. Being unable to play for a year is a very painful experience for any musician. And when you suffer an injury you tend to find yourself embroiled in a gruelling odyssey. That is what this book is about: I want to help you avoid making the same mistakes I made. Our training is based mainly on theoretical and practical issues related to our instrument and leaves aside a crucial subject: ***knowledge of our body***.

Athletes and dancers clearly understand from the start of their training that looking after their body and maintaining it properly is vitally important for a successful career. Why is the same not true of musicians?

For a long time, perhaps, people have underestimated the physical effort a musician makes when playing. We are one of the groups most likely to be injured while practising our profession, not to mention the taboo surrounding injuries suffered by musicians: the idea that "those who get injured are bad musicians". Nothing could be further from the truth. There are a number of factors that can cause us to be injured, and for that reason we need to be aware, from the start of our career, of the physical risks involved in playing an instrument.

Fortunately, this state of affairs is changing; most advanced conservatoires in Spain and some of the intermediate ones are including courses related to injury prevention and healthy posture in their curricula. Teacher training institutions offer conservatoire teachers specific training on the subject.

This book, written in simple language, adds to the growing trend towards better understanding, treatment and recognition of our true situation, in which all the interested parties must be engaged: musicians, teachers, parents, doctors, therapists, teacher training institutions, conservatoire directors, institutions, and others.

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Percussion: Gabriel Valcarcer
Electric guitar: Haimar Arejita "Gatibu"
Bass guitar: Chuchi Marcos
Drums: Oscar Martín

Chapter 1

Anatomy for musicians

1.1 Introduction

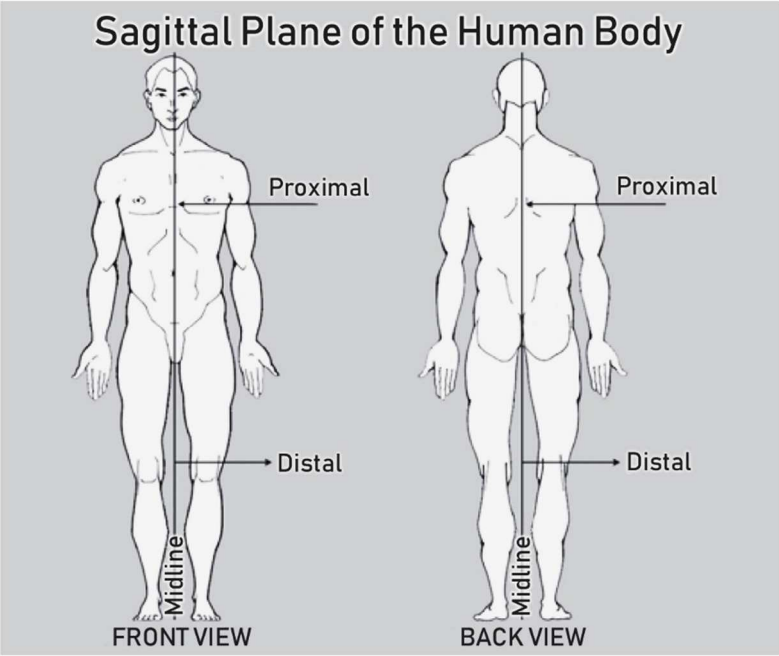
Never forget that your first instrument is your body. We spend an average of fourteen years studying to be musicians until we have completed our theoretical and practical training. And yet when you finish your studies you will probably not have found out how your body behaves when you play or sing.

In this chapter I will try to explain to you in very simple terms how it works. Knowing this will help you understand how the various systems it comprises (nervous, musculoskeletal, respiratory, etc.) relate to each other when you play or sing. I am convinced that this will improve your performance and prevent you getting injured.

1.2 The planes of the human body

To study the human body we are going to start from what we will call the **standard anatomical position**. This means having the body upright (standing), looking straight ahead, with the arms extended downwards, the palms of the hands facing forwards (with the forearms in supination), the legs extended and slightly apart (in abduction) and the ankles and feet extended with the toes pointing forwards. Starting from this position, we will mention all the structures of the body, referring always to the individual's left or right.

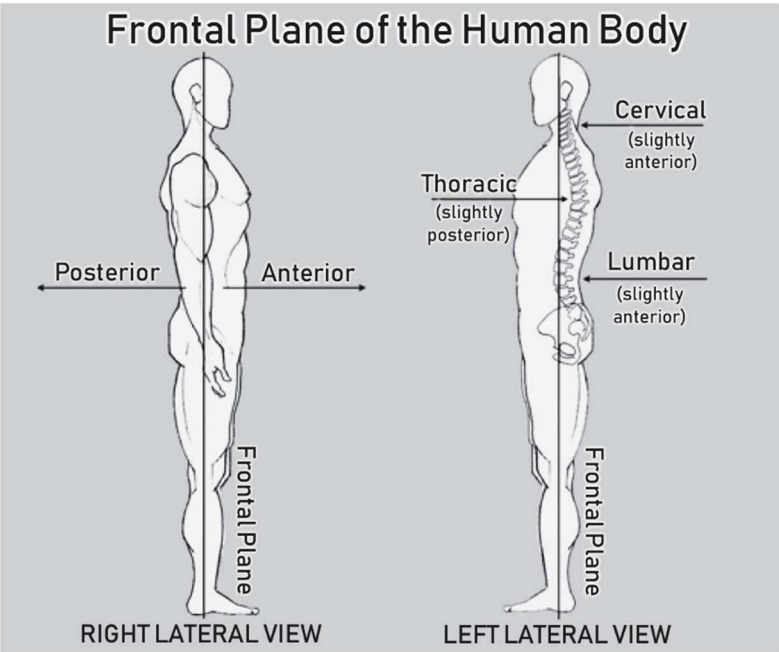
Figure 1. Sagittal plane



The Sagittal Plane runs vertically through the centre of the human body, dividing it into two equal zones: left and right. Everything close to this plane is proximal and everything further away from it is distal.

The Frontal Plane also runs vertically though the centre of the body, dividing it into two zones: anterior (ventral or front) and posterior (dorsal or back).

Figure 2. Frontal plane



1.6 Respiration (breathing)

The main object of respiration is to enable **haematosis** to take place: turning venous blood into arterial blood. It makes it possible to exchange carbon dioxide for oxygen in the lungs, through a process known as **ventilation**. Arterial blood, in turn, carries oxygen to the cells and venous blood removes carbon dioxide from the body tissues; this is called **cellular respiration**.

Under normal conditions we breathe between 12 and 15 times per minute. This rate can vary when we practise sport, play our instrument or sing, but remember that breathing is an involuntary act, although unlike other involuntary activities such as heartbeat, digestion, etc., we can significantly influence the way we do it through our will, changing the speed and type of breathing. For a wind player or a singer, therefore, the most important thing is to turn this involuntary movement into a **voluntary** process (which they could not do with their heart-beat).

Should you breathe through the nose or through the mouth?

a) When you breathe through your **nose**:

- The air is warmed and humidified by your nasal mucus
- The air is cleaned of dust, filtered by your nasal hairs or mucus and purified of bacteria.

You mainly take in air through your nose and expel it through your mouth. You breathe like this when you are running.

b) When you breathe through your **mouth**:

- The air meets less resistance and travels a shorter distance.
- You can take deep breaths more easily.
- You can modify the air flow more easily.

This type of respiration is very useful when you want to breathe as deeply as possible, during intense physical activities, for example, or when playing a wind instrument or singing.

Chapter 2

Keys to maintaining good posture

2.1 Introduction

The fact is that maintaining good posture while working on your instrument or in your other activities is one of the most neglected issues in musical education. We spend many hours a day practising without being aware of whether our posture is the most suitable. The great majority of musicians have no idea what position they should adopt when playing their instrument, and if they were asked: "do you know whether your posture, standing or sitting, is correct?", the answer would usually be "**NO**".

Getting used to adopting a good posture with your instrument is no easy task. Musicians have usually spent many years playing in the same position and it is always difficult to change. But bear in mind that **good posture will be useful to you for your whole life**.

If your posture is wrong (even if you feel very comfortable with it) and you decide to change it, on the recommendation of your teacher or a specialist, you must not be in a hurry; it may take you up to a year to adapt to these changes. At first you may feel pain or discomfort in your muscles (mainly in your back) when you try to modify your posture, because they will need to adapt to the new situation until you manage to make it a habit that comes naturally.

Although each instrument has specific features because of its shape and position, there are basic ergonomic principles related to good placement that can be applied to them all.

What will you achieve with good posture?

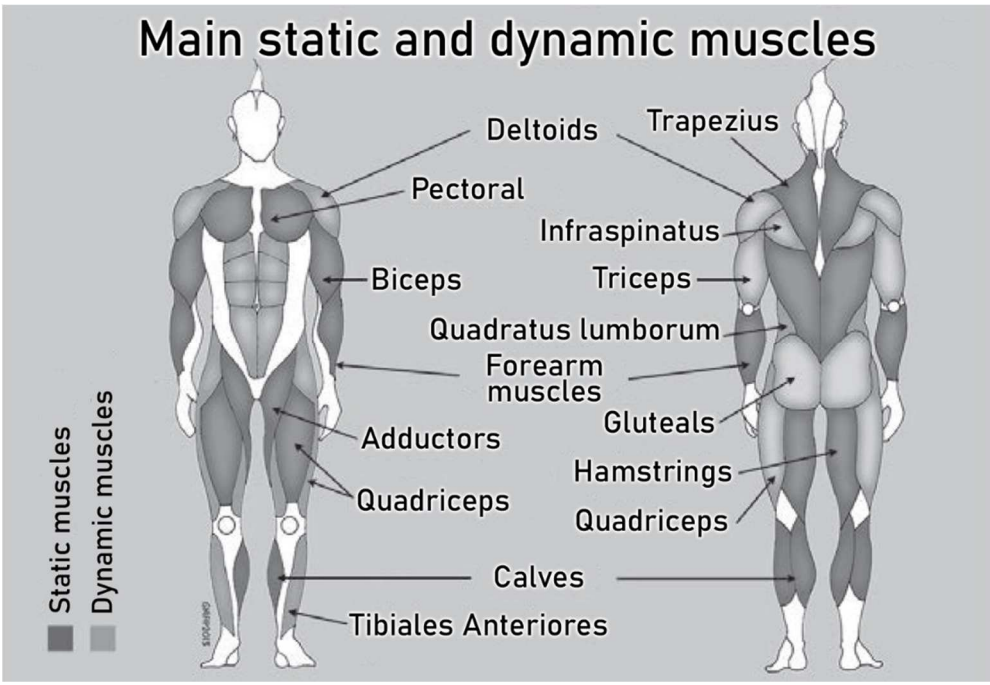
Maintaining good posture will allow your muscles to work in a healthy way, preventing frequent muscle fatigue and tiredness and enabling you to reduce your energy expenditure to the minimum.

The muscles involved in posture can be divided into two groups, depending on their function:

Static muscles: these are responsible for maintaining the shape of the body to give it stability. They generally have high tone[1] and are located in the trunk and/or the areas close to the joints. They have a tendency to shorten and become rigid, as they are constantly activated to keep us upright. They can suffer spasms if they are not used properly.

Dynamic muscles: these are responsible for producing movement in the joints by contracting and relaxing. They contract and relax rapidly and are mostly situated in the limbs. They do not often shorten, as they are only activated when movement takes place.

Figure 1



As you have seen, the main difference between the static and dynamic muscles is that the prime function of the former is to keep your body stable, both standing and sitting, whereas the dynamic muscles are those you use to produce movement and therefore to play your instrument.

2.2 Sitting position

The spine is not designed for you to spend many hours a day sitting, although you carry out most of your work and practice in that position. Musicians ought to be more aware of how important it is to adopt good posture with and without their instruments. It will do you no good to maintain a good position

1 Degree of muscle contraction.

Chapter 3

Correct and incorrect postures by instrument

3.1 PIANO: position at the instrument

In principle, posture at the piano should be the most natural possible, since pianists sit at their instrument symmetrically. Obviously there is no single piano technique, but you must find the posture that best fits your characteristics and causes you the least possible harm.

3.1.1 Position of the legs and feet

a. Ideal position

Figure 1

Your feet should be positioned in front of the pedals, with your heels resting on the floor. When you are not using the pedals, the whole of your feet should be on the floor, so as to distribute your body weight evenly. The angle of your knees should be between 90º and 110º. Remember that your body weight should be distributed between your ischia (the bones at the base of your pelvis; 75%) and your feet (25%). Sit at the front of the stool and think of your head moving upwards.

3.2 ORGAN: position at the instrument

The organ is a complex instrument owing to the fact that its size is not standardised. Depending on the type of organ (Iberian, Romantic or contemporary), you will find different keyboards, music stands, stops, benches and pedalboards. Organists have to adapt to the instrument, trying to maintain a posture suited to its physical features that is as natural and non-harmful as possible.

3.2.1 Position of the legs and feet

a. Ideal position

Figure 1

When your feet are not on the pedalboard, the angle of your knees should be between 110º and 120º. Remember that your body weight should be distributed between your ischia (75%) and your feet (25%). Sit on the front of the bench and think of your head moving upwards.

3.3 VIOLIN and VIOLA: playing position

STANDING

3.3.1 Position of the legs and feet

a. Ideal position

Figure 1. Front view

Figure 2. Back view

To distribute your body weight evenly your feet must be aligned with your shoulders and your knees slightly bent.

3.4 CELLO: playing position

Cellists are among the few instrumentalists, along with keyboard players, who always have to play sitting down. Remember that when you are sitting, your vertebral discs have to bear three times as much weight, and you must pay special attention to your position to avoid hurting yourself.

3.4.1 Position of the legs and feet

a. Ideal position

Your body weight should be distributed between your ischia (the bones at the base of your pelvis; 75%) and your feet (25%). The angle of your knees will be between 90º and 110º. Your feet and knees cannot be in line with your shoulders, as they have to accommodate the instrument; they are slightly more open and parallel to each other. Do not exert too much pressure with your knees to hold the cello; it is the endpin or spike that supports the weight of the instrument. If your feet are firmly planted you will be able to get up from the chair without using your hands.

Figure 1

Figure 2

3.5 DOUBLE BASS: playing position

The double bass poses a series of problems, mainly due to its size, which can vary, since its dimensions are not standardised. Double bassists depend to a large extent on their height and the length of their arms to adapt to the instrument; therefore you have to adapt as best you can, bearing in mind your physical characteristics, to avoid hurting yourself.

STANDING

3.5.1 Position of the legs and feet

a. Ideal position

Figure 1

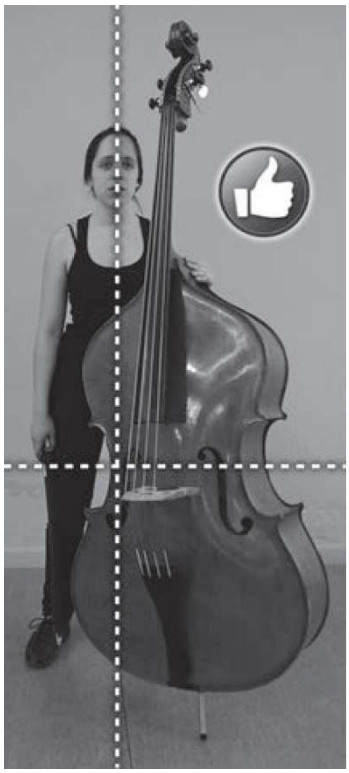


Figure 2

3.6 HARP: position at the instrument

The size of the harp and its weight (45–47 kg; 99–104 lb) will determine your posture throughout your whole career, since it will force you to adopt an asymmetrical position. As you always have to play sitting down, remember that when you are sitting, your vertebral discs have to bear three times as much weight, with the risks that this entails for your back.

POINTS OF SUPPORT

Figure 1

Figure 2

3.7 GUITAR: playing position

The position of guitarists has always been associated with asymmetry of the legs and back, due to the use of footstools in classical guitar and the crossed leg position in flamenco. Clearly, maintaining these postures over many years will adversly affect your health, so supports like Ergoplay are vital, in my opinion, to prevent inevitable injuries.

3.7.1 Position of the legs and feet

a. Ideal position

Figure 1

Figure 2

Your body weight should be distributed between your ischia (75%) and your feet (25%). The angle of your knees will be 90º for the left leg and 80º for the right. Your feet and knees cannot be aligned with your shoulders, as they have to accommodate the intrument; they are slightly further apart.

3.8 PERCUSSION: position at the instrument

3.8.1 SIDE DRUM: position of the head, back and legs

a. Ideal position

Figure 1

Figure 2

Figure 3

To spread your weight evenly in four equal parts (feet and knees), your feet must be aligned with your shoulders and your knees slightly bent. Your back must be upright, maintaining its natural curvatures (neutral pelvis position). Think upwards, as if you wanted to grow taller. While you are playing, try to look straight ahead as much as possible and not down at the drum. To look at the drum, lower your eyes while keeping your head in the upright position. Your shoulders must be kept aligned. Remember that "**the drum comes to the drummer, not the drummer to the drum**".

3.9 CLARINET and OBOE: playing position

Throughout your career your right thumb will have to bear a weight of 800 g–1 kg (1.75–2.2 pounds). Given that supporting this weight is excessive even for an adult and can produce injuries in the hand and forearm, you must be aware that when students begin to learn these instruments (at the age of 8–10), they ought to be able to start on a lighter instrument. Manufacturers are producing such instruments nowadays, and although they do not have the sound quality of wooden instruments, they will avoid young students being prematurely injured.

STANDING

3.9.1 Position of the legs and feet

a. Ideal position

Figure 1

Figure 2

To distribute your body weight evenly, your feet must be aligned with your shoulders and your knees slightly bent.

3.10 BASSOON: playing position

STANDING

3.10.1 Position of the legs and feet

a. Ideal position

Figure 1

Figure 2

Figure 3

To distribute your body weight evenly, your knees must be slightly bent. Your feet are not aligned with your shoulders; the left shoulder is slightly further forward than the right.

3.11 FLUTE: playing position

STANDING

3.11.1 Position of the legs and feet

a. Ideal position

Figure 1

Figure 2

Figure 3

To distribute your body weight evenly, your knees must be slightly bent. Your feet are not aligned with your shoulders; the left shoulder is slightly further forward than the right.

3.12 SAXOPHONE: playing position

STANDING

3.12.1 ALTO and SOPRANO SAXOPHONE: position of the legs and feet

a. Ideal position

Figure 1

Figure 2

Figure 3

To distribute your body weight evenly, your feet must be aligned with your shoulders and your knees slightly bent.

3.13 TROMBONE: playing position

STANDING

3.13.1 Position of the legs and feet

a. Ideal position

Figure 1

Figure 2

Figure 3

To distribute your body weight evenly, your feet must be aligned with your shoulders and your knees slightly bent. You can use a wall or a pillar to help you maintain good posture. Move your feet apart to shoulder width. Put your back and your heels up against the wall, bend your knees slightly and place your pelvis in the neutral (middle) position. You will find that the wall forces you to stand correctly.

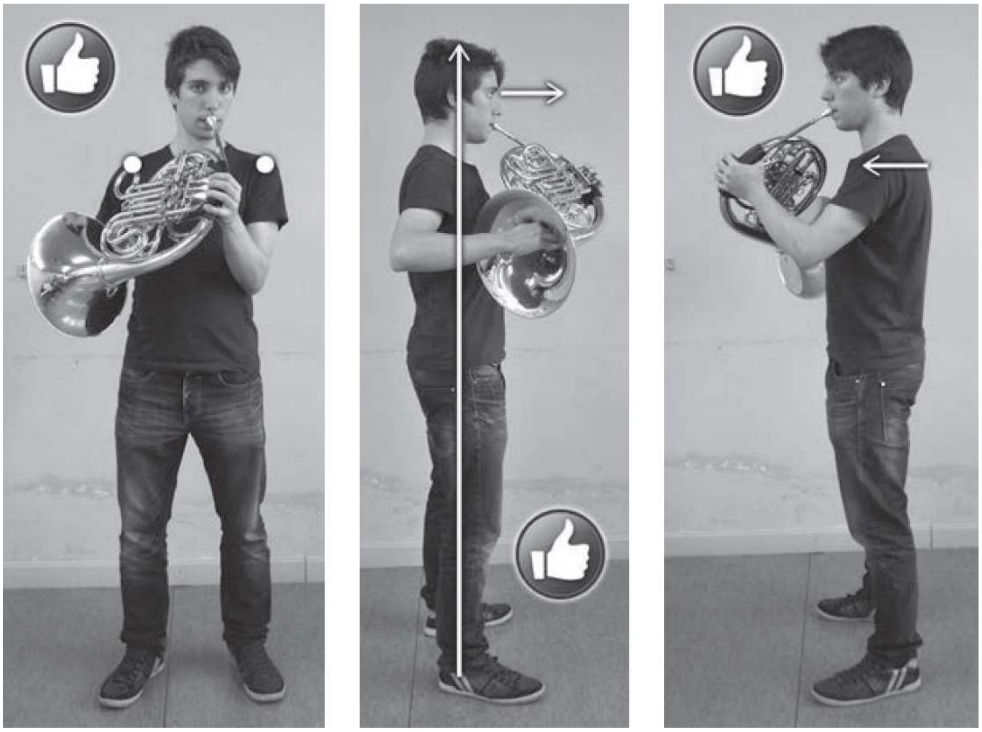
3.14 HORN: playing position

STANDING

3.14.1 Position of the head, back and legs

a. Ideal position

Figure 1 Figure 2 Figure 3



To distribute your weight evenly into four parts (feet and knees), your knees must be slightly bent with your pelvis in the neutral position, maintaining the natural curvatures of your back. Your shoulders are not aligned with your feet, since when you hold the instrument to play you rotate your torso slightly to the right. Your left shoulder is further forward and your right shoulder further back. You should think of your head moving upwards, as if you wanted to grow taller.

3.15 TRUMPET: playing position

STANDING

3.15.1 Position of the legs and feet

a. Ideal position

Figure 1

Figure 2

To distribute your body weight evenly, your feet must be aligned with your shoulders and your knees slightly bent.

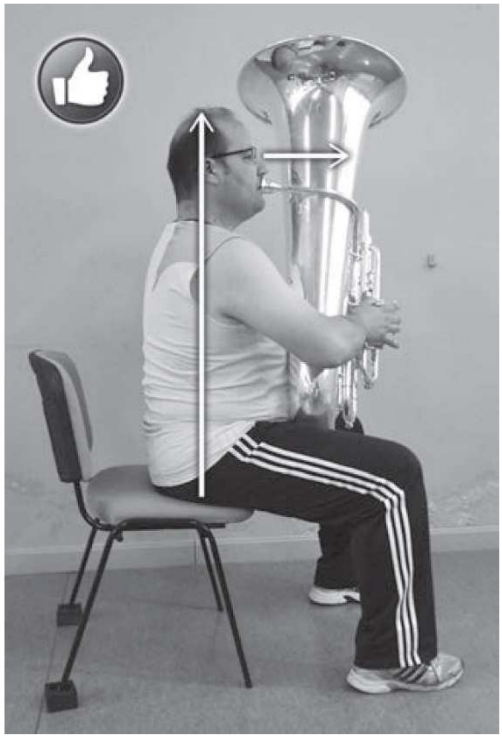
3.16 TUBA and EUPHONIUM: playing position

3.16.1 Sitting: feet, legs, back and head

a. Ideal position

Figure 1

Figure 2



Remember that your body weight should be distributed between your ischia (the bones at the base of your pelvis; 75%) and your feet (25%). Sit at the front of the seat, think of your head moving upwards, and try to look straight ahead as much as possible. The angle of your knees should be between 90º and 110º. Your feet are not aligned with your shoulders; your legs are separated to accommodate the instrument. The points of support for bearing the weight of the tuba are the left leg (90%), on which you should place a piece of non-slip fabric, and the right leg (10%). The left hand does not support any of the weight; it simply balances the instrument and moves the slides to correct the tuning.

3.17 ELECTRIC GUITAR: playing position

STANDING

3.17.1 Position of the legs and feet

a. Ideal position

Figure 1

Figure 2

Figure 3

To distribute your body weight evenly, your feet must be aligned with your shoulders and your knees slightly bent.

3.18 ELECTRIC BASS: playing position

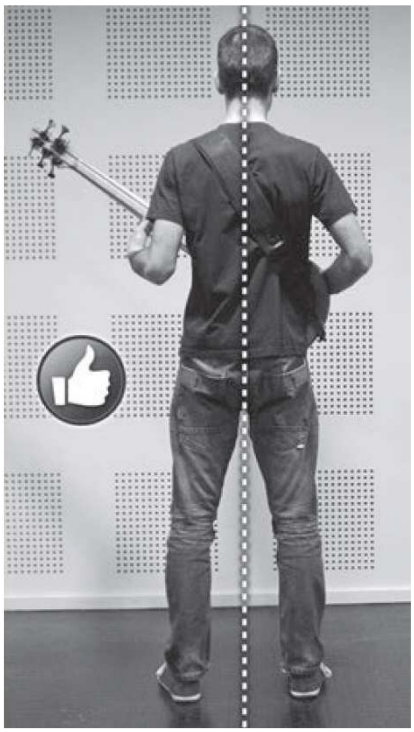
STANDING

3.18.1 Position of the legs and feet

a. Ideal position

Figure 1

Figure 2



To distribute your body weight evenly, your feet must be aligned with your shoulders and your knees slightly bent.

3.19 DRUMS: playing position

3.19.1 Sitting position, feet, legs, back and head

a. Ideal position

Figure 1

Figure 2

Your body weight should be distributed between your ischia (the bones at the base of your pelvis; 75%) and your feet (25%). The angle of your knees should be between 90º and 110º. Your feet are not aligned with your shoulders; your legs are separated to place your feet on the pedals. Your pelvis is in the neutral (middle) position, maintaining the natural curvatures of your back. You should think of your head moving upwards, as if you wanted to grow taller. If you are sitting properly you will find that your back and legs form an "L" shape, with an inverted "L" (˥) between your upper and lower legs. Choosing a good stool of the right height is crucial to maintaining a good position at the drums.

Chapter 4

The most common types of injuries

4.1 Introduction

All of us, as musicians, have tissues that can be injured by constant practice on our instrument. The most common cause of muscle or joint injury, in the great majority of musicians, is **overuse**. We could define this as "injury caused by repeated microtrauma leading to excessive wear of muscles and tendons in a specific region of the body through impact, overload or friction". The upper limbs are particularly vulnerable to this type of injury, because of the constant specialised work involved in hours of continual repetition and intense practice.

Every time musicians subject their muscles to stress, some of the fibres may not receive the supply of glycocen[1] they need for healthy functioning. If this happens, only the healthy fibres will work properly, and consequently intense practice on your instrument will exert the same stress on a smaller number of fibres, increasing the likelihood of injury. Remember that when muscles start to be injured, the tendons are also affected. If you continue playing when pain appears, your injury may get worse. Fibres need approximately 36–48 hours to recover and replenish their glycogen after intense effort.

Among musicians as a group, the risk of suffering a chronic lesion is very high, because every instrument involves repetitive movements of certain muscle groups. As you already know, playing a musical instrument for many hours a day over many years is an **unnatural** activity.

1 Glycogen is the fuel that muscles use to generate muscle contraction. We obtain it by consuming carbohydrates in food.

It is very important for every musician, as an integral part of their training, to learn to minimise the factors that cause injuries, recognise the danger signs and keep a check on the problems when they appear.

How do you recognise the danger signs?

Pain usually appears in the fingers, wrist, upper arm or forearm. Initially you will feel a loss of strength and coordination. The pain is mild at first and usually confined to a specific area. When you feel the first symptoms of an overuse injury, your best weapon is rest. But the problem that arises with musicians and others who perform activities of great intensity with their hands is that they feel unable to stop working and do not want to do so. They carry on using their hands, aggravating the injury.

4.2 Phases of overuse injuries in muscles and tendons

What most musicians do not realise is that by they time they discover that they have a muscle or tendon injury, it has usually become chronically established. You may find it alarming to hear the word "chronic", but remember that "chronic" does not mean "irreversible". In the great majority of cases, chronic overuse pathologies can be solved.

a) Tendinitis: acute phase

This begins when the injury actually occurs. There is pain and inflammation (usually not visible to the naked eye) in the injured area. The acute phase lasts for the first two weeks of painful symptoms.

b) Tendinitis: subacute phase

This phase arises because proper repair of the tendon has not occurred. It is an intermediate stage between the acute and chronic phases and usually lasts four to six weeks from the onset of the lesion.

c) Tendinosis: chronic phase

There is no inflammation; a degeneration of the tendon fibres has occurred through repeated microtears. The colour of the tendon changes from white to yellowish grey or even brown. This phase tends to emerge when the injury has been present for more than six weeks, and recovery can take years if the injury is not treated correctly.

Chapter 5

Practical exercises for musicians

Before starting the day's practice or rehearsal with your instrument, you should warm up your muscles and joints, as athletes do. Why? The object of doing these exercises on a regular basis, as a musician, is to prepare your body for an activity you are about to undertake: **playing**.

What effects do warm-up exercises have on your body?

1. They raise your body temperature, preparing and relaxing your muscles before you play.

2. They increase blood supply and therefore perfusion of the muscles, delaying the onset of fatigue.

3. They enhance and speed up the transmission of nerve impulses.

4. They increase flexibility and mobility of the joints, thereby reducing the risk of injury.

5. They enhance your mental abilities, improving your attention, reflexes and concentration.

When do you need to do warm-up exercises?

Always before starting to play your instrument. After warming up your muscles, you should do a warm-up on your instrument, slowly and gently, for 8–10 minutes (scales, arpeggios, long notes, etc.), with no tension: legato exercises.

Are stretching exercises part of warming up?

The answer is **NO**. Stretching exercises do not warm your muscles or joints. You can do them in your breaks or at any time during your practice session, provided that your muscles are already warm.

5.2 Stretching

During your daily practice on your instrument you are constantly contracting and relaxing your muscles to produce movement. The problem that arises is that while you are practising, or afterwards, some of your muscles may be shortened. Regular stretching exercises enable you to maintain them at their optimum length to ensure that they remain elastic for your next day's practice.

What effects do stretching exercises have on your body?

- They enhance your body awareness, allowing more freedom of movement
- They reduce muscle tension and make your body feel more relaxed
- They promote blood and lymph circulation
- They improve coordination of movements
- They enhance circulation and oxygenation of muscles, and therefore their recovery

When should you do stretching exercises?

During your breaks and always at the end of your day of practice. This will enable your muscles to recover the elasticity they have lost while you were practising your instrument.

How long should stretching take?

Approximately 15–20 seconds should be devoted to each exercise.

5.3 Strengthening exercises

Musicians tend to develop certain parts of their body more than others as a result of working on their instrument day by day, especially their forearm muscles. By performing strengthening exercises regularly you will obtain stronger muscles and tendons, reducing the risk of suffering injuries.

How often do you need to do these exercises?

To achieve good results with weights or exercises in general you should do them at least 2–3 times per week, always with a rest day in between.

How many times do you have to repeat each exercise?

You should do between 8 and 15 repetitions of each exercise. Since you are doing them to strengthen your muscles and not for aesthetic purposes, when performing exercises with weights choose a number of kilos that does not leave you with muscle fatigue when you have finished your repetitions.

Do you need to hold your breath while performing strengthening exercises?

It is very important not to hold your breath when you are doing strengthening exercises. Your breathing should be as relaxed as possible.

The exercises I suggest below are designed to strengthen the muscles of your torso and upper limbs. We will avoid working on the forearm muscles, since they are the ones that we use most for playing and are the most developed.

5.4 Self-treatments

The following exercises are designed to keep your muscles in good physical condition and preserve their elasticity. You can do them at any time during the day if you feel tired, or simply as a way of maintaining your body properly. They are more effective if you do them while your muscles and joints are warm. Their main object is to prevent injuries by stopping pain from arising, turning you into your own masseur or masseuse.

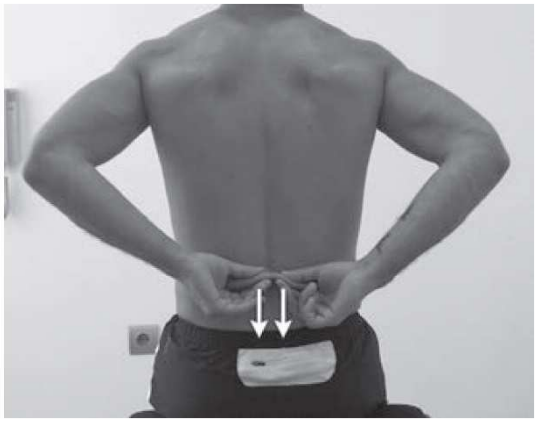
5.4.1 Skin-rolling over the lumbar region

When you spend a lot of time sitting during the day, you run the risk of losing elasticity in the lumbar region. The aim of this exercise is to keep the skin in this area more elastic by preventing adhesions from forming (as if your skin were sticking to the muscles) over the lumbar region.

1. Sit at the front of a chair with your feet resting on the floor and lean your pelvis forwards so as to increase the curvature of your lumbar spine. Pinch the skin in this region with your thumbs and index fingers. Maintaining your position, roll the pinch up and down like a wave without releasing the skin.

Figure 1

Figure 2



5.5 Treating trigger points

Repeated microtrauma, physical and emotional stress, lack of rest or incorrect posture while playing may lead muscles to lose their elasticity. When a muscle is shortened (contractured), a compression of the blood vessels occurs and the supply of oxygen and nutrients to the area is reduced. This condition can give rise to a tense band within the muscle, containing a painful spot called a **trigger point**, commonly known as a **knot**.

How do you locate trigger points on muscles?

By palpation. They are very sensitive small areas (between 0.5 and 1 cm). When you palpate them they feel rigid and produce pain, limiting the range of stretching. They mostly appear in the neck muscles, the shoulder girdle and the upper limbs.

Self-treatment

To eliminate them, use your fingertips directly or a tennis ball, leaning on the trigger point, against the wall.

1. **PRESSURE:** press on the trigger point for 2–3 minutes. This pressure is painful at first but it gradually fades when you stop pressing.
2. **SELF-MASSAGE:** perform a little massage with your fingers or with the ball after pressing on the trigger point.
3. **STRETCHING:** this enables you to elongate muscles that have become shortened. The muscle returns to its normal length, recovering its range of motion.

Chapter 6

Basic principles of diet and practice techniques

6.1 Introduction to nutrition

Your body's prime function is to maintain itself in equilibrium so as to keep you healthy. A complete and balanced diet provides it with all the proteins, carbohydrates, fats, fibre, liquids, vitamins, minerals and micronutrients it needs. When you overeat, you are combining foods badly or consuming unsuitable food, making it impossible for your body to rid itself of toxins and forcing it to store excess fat.

6.1.1 Food types

Carbohydrates

Carbohydrates, also known as saccharides, are found almost exclusively in foods of plant origin. They are one of the three main chemical groups that make up organic matter, along with fats and proteins. Normally they are found in the structural parts of plants, and also in animal tissues, as glucose or glycogen. They serve as a source of energy for all cellular activity and account for 50% of all the energy our body needs. It is estimated that the **minimum** daily intake is 75–100 grams, and a normal adult requires 400 g.

Types of carbohydrates

a) Simple sugars: glucose and fructose. This type of carbohydrate has one or two kinds of sugar molecules which are used rapidly by the body or stored as glucose for later use; excess carbohydrates are converted into fat if they are not burned. Examples: table sugar, sweets, mass-produced pastries, refined flours.

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