

**12. Other questions .....117**

Atsuto Yoshizawa

- Q12-1: What did you learn from the examination of 76 thalidomide-impaired patients?
- Q12-2: How high does blood pressure measured at the ankle at home have to be for it to be considered hypertension?
- Q12-3: Where is the posterior tibial artery located?
- Q12-4: How do you deal with the fact that blood pressure measured at the lower limbs can differ between left and right?
- Q12-5: Have similar large-scale medical examinations and surveys been done in the United Kingdom and Germany?
- Q12-6: Have other countries also compiled a detailed Q&A on health problems in thalidomide-impaired people?
- Q12-7: When I go for medical appointments, the doctors say that they do not know about thalidomide-induced disabilities and ask me if there are any useful reference materials or articles. What should I say?
- Q12-8: Do thalidomide-impaired people have any particular health problems to be aware of?
- Q12-9: Is the ideal body weight for people with undeveloped upper limbs equivalent to that in the general population? How do I know whether or not I am obese?
- Q12-10: Are people with undeveloped or underdeveloped upper limbs susceptible to gaining weight?
- Q12-11: I worry about having my blood taken because it is always difficult. Are there any leaflets or information I can show the nurses when they take my blood?

**13. Related publications .....129**

**Source materials .....130**

- Source 1: Techniques for withdrawing blood from thalidomide-impaired patients
- Source 2: Hearing-impaired patients: Upper gastrointestinal endoscopy (through the mouth)  
Supporting document
- Source 3: Hearing-impaired patients: Upper gastrointestinal endoscopy (through the nose)  
Supporting document
- Source 4: Hearing-impaired patients: Respiratory function tests supporting document
- Source 5: Hearing-impaired patients: Eye tests supporting document
- Source 6: Hearing-impaired patients: Gynecological examination supporting document

## 1. Basic facts about thalidomide impairment

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#### Main authors

Q1-1-4: Ryoji Kayamori

Q1-5: Misato Tanaka

Q1-6: Ryoji Kayamori

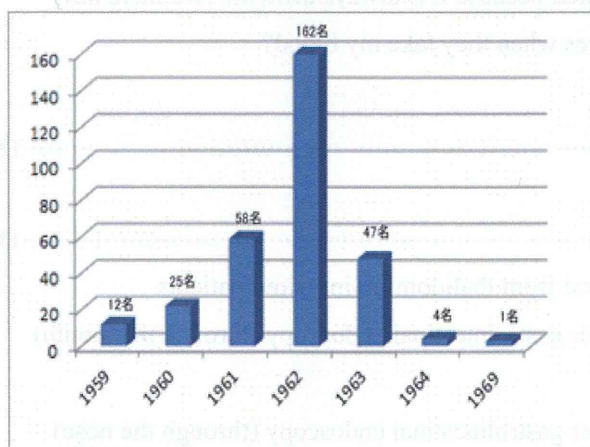
Q1-7: Atsuto Yoshizawa

#### Q1-1: When did the thalidomide crisis occur and how many Japanese victims are there?

• 309 people were recognized as being affected by thalidomide in Japan, and 295 of these were still alive as of April 2012.

Thalidomide was first marketed in West Germany in 1957 as a sleep medication under the name Contergan. It went on sale in Japan in 1958 as the sleep medication Isomin. In 1960, the digestive medicine Pro-ban M, which contained a small amount of thalidomide, also came on the market. Infants with thalidomide-induced defects were born to mothers who had taken thalidomide in early pregnancy. Birth defects were observed commencing in 1959 and reached a peak in 1962 (Fig. 1). Three hundred and nine people were recognized as being affected by thalidomide in Japan, 295 of whom were still alive in April 2012. The total number of victims worldwide is estimated at 5,850.

**Fig. 1** Number of infants born with thalidomide-impairment in Japan



#### Q1-2: What types of birth defects did thalidomide cause?

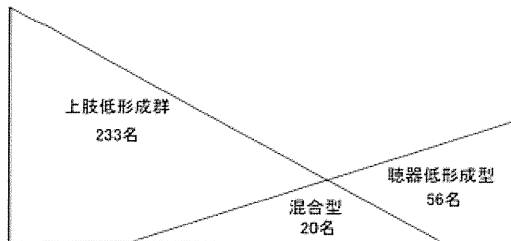
There are three patterns of thalidomide-induced defects: victims either have upper limb reduction defects (also called upper limb phocomelia, upper limb underdevelopment, etc.), hearing organ

## 1. Basic facts about thalidomide impairment

reduction defects or a mixture of the two.

Upper limb reduction accounts for 75% of the defects, with the remaining 25% being hearing organ reduction and mixed defects.

**Fig. 2 Number of Japanese thalidomide victims with each defect type**



上肢低形成群 : Upper limb reduction defects: 233

混合型 : Mixed: 20

聴器低形成型 : hearing organ reduction defects: 56

### **Q1-3: What are the features of upper limb reduction defects?**

- These defects range from absence of upper limbs to underdevelopment of the thenar muscles (the group of muscles in the palm at the base of the thumb) and a triphalangeal thumb, and include defects between these two extremes.

Three Japanese victims also have underdeveloped lower limbs, one of whom relies on a wheelchair for mobility because of the severity of underdevelopment.

### **Q1-4: I didn't know there were thalidomide-impaired patients with hearing organ reduction defects. What are the features of hearing organ reduction defects?**

**These defects are mainly accompanied by sensorineural or mixed hearing loss.**

In many cases, there is also absence or underdevelopment of the abducens nucleus, facial nerve nucleus or nerves peripheral to these. The oculomotor nerve compensates for the absence or underdevelopment of the abducens nucleus or nerve, resulting in Duane's syndrome. Facial nerve paralysis and Bogorad's syndrome are also common complications.

### **Q1-5: What are the important points when examining patients with hearing impairment?**

## 1. Basic facts about thalidomide impairment

- **Both the patient and the doctor should make sure that the speaker's face is visible. Talking while wearing a mask must be avoided, as must talking while facing a computer.**

Hearing impairment (hearing loss) is often difficult to appreciate because it is an invisible impairment, and many people find communication a challenge even if (or perhaps because) their hearing loss is mild.

Communication difficulties arising from impaired hearing, and the responses to those difficulties, differ according to the extent and nature of the hearing loss.

### 1. People with mild hearing loss

People who can hold a conversation and have no obvious pronunciation problems do not give the impression of having hearing loss. From the standpoint of the person with hearing loss, this can be a problem if, for example, the other person is soft-spoken, lacks clear pronunciation, speaks quickly, or if there is extraneous noise, etc. In such situations, the person with mild hearing loss may mishear or may miss some of what is said, and will naturally ask the speaker to repeat what they have said. If this happens, it is important to ask if the person has hearing loss.

People with impaired hearing naturally learn to visually compensate for their hearing deficit through lip-reading, irrespective of the severity of hearing loss. When talking to a hearing-impaired person, it is therefore necessary for both parties to ensure that the speaker's entire face is visible. Talking whilst wearing a mask must be avoided, as must talking while facing a computer.

### 2. Hearing aid users

Most people use hearing aids when their hearing loss becomes moderate or worse. However, hearing aid users are still unable to hear like ordinary people. Conversation is difficult in groups, in noisy environments, when the listener and speaker are at a distance from each other, etc.

### 3. Severely hearing-impaired and profoundly deaf

As hearing loss becomes more severe, hearing aids become less useful. For these people, sign language is an important means of communication. A sign language interpreter will often accompany the patient to the hospital, but written communication must be used if no interpreter is available. A pen and paper should be prepared for such situations.

Whether through lip reading, sign language or writing, the hearing impaired person obviously relies on vision for communication. If tests need to be carried out under dark conditions, strategies are needed to deal with this.

## **Q1-6 Are there any impairments other than in the upper limbs and hearing organs?**

## 1. Basic facts about thalidomide impairment

- Other impairments can include organ malformations, such as congenital absence of the gallbladder, heart malformations, mental handicaps, scoliosis, spina bifida occulta, block vertebrae of the cervical spine, lumbarization of the sacrum (L6), hip dislocation due to hip dysplasia, etc.

### **Q1-7: Where can I find medical literature on thalidomide?**

- **There are no websites with collections of medical articles on thalidomide.**

This Q&A was prepared because there is currently nowhere that healthcare professionals can turn to when faced with questions about thalidomide in routine medical practice.

The following websites may provide useful information.

(Japanese and English language sites only)

- <http://www008.upp.so-net.ne.jp/ishizue/> Japan
- <http://www.thalidomideuk.com/> United Kingdom
- <http://www.thalidomidesociety.co.uk/> United Kingdom
- <http://www.thalidomide.ca/summary/> Canada
- <http://www.thalidomide.ca/links/> Canada

## 2. Comments from the Department of Orthopedic Surgery and Department of Rehabilitation

Main author: Ryoji kayamori

### Q2-1: What are the causes of shoulder pain?

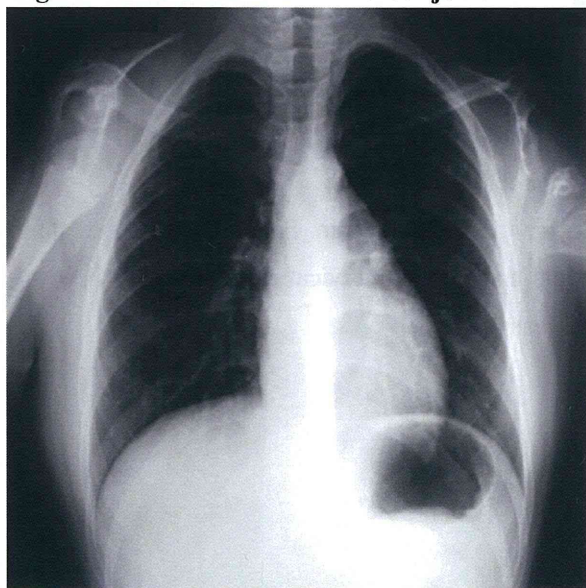
- There are several contributory factors, the main ones being underdevelopment of the humerus and the humeral head that form part of the shoulder joint. Atrophy of the shoulder girdle muscles and spondylosis are other possible causes.

#### 1) Underdevelopment of the shoulder joint

Underdevelopment of both shoulder joints is seen in over 100 Japanese thalidomide victims. In Fig. 1, there is underdevelopment of both the left and right humerus, with dislocation of the right shoulder. This is a result of underdevelopment of the shoulder girdle muscles rather than any problems inside the joint.

**Advice:** In day-to-day life, shoulder pain can be managed by avoiding holding things with the hands, etc. Conservative physical therapy is appropriate, and heat therapy and massage will be effective to a certain extent. Endoscopic therapy is unsuitable.

**Fig. 1 Dislocation of the shoulder joint**



## 2. Comments from Departments of Orthopedic Surgery and Rehabilitation

### 2) Underdevelopment of shoulder girdle muscles

If there is underdevelopment of the humerus or the shoulder joint is dislocated, the corresponding shoulder girdle muscles will also be underdeveloped and become easily fatigued due to the weight of the upper limb or when carrying bags etc. (Fig. 2).

**Advice:** Overuse of the underdeveloped muscles should be avoided. Treatments such as heat therapy and massage are appropriate.

**Fig. 2 Atrophy of shoulder girdle muscles**

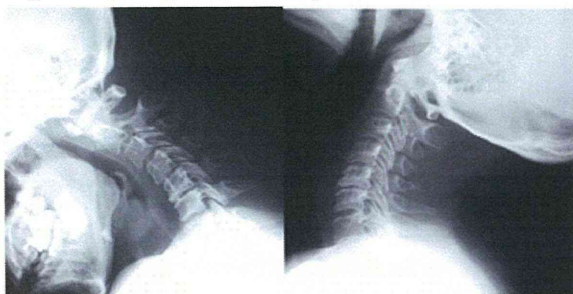


### 3) Spondylosis

The cervical vertebrae progressively degenerate with age. Figure 3 shows an X-ray of a 40-year-old, in which C4/C5 are already unstable under cervical flexion.

**Advice:** Heat therapy and massage are appropriate for the shoulder pain. Patients with upper limb numbness, muscle weakness in the hands and fingers and marked cervical instability will need to wear a neck brace. We use cervical collars, which are easy to fit.

**Fig. 3 Cervical instability**



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### 4) Block vertebrae

When block vertebrae develop in the cervical spine (Fig. 4), the range of movement at the block is limited, resulting in excessive loading on the surrounding vertebral bodies and more rapid worsening of spondylosis.

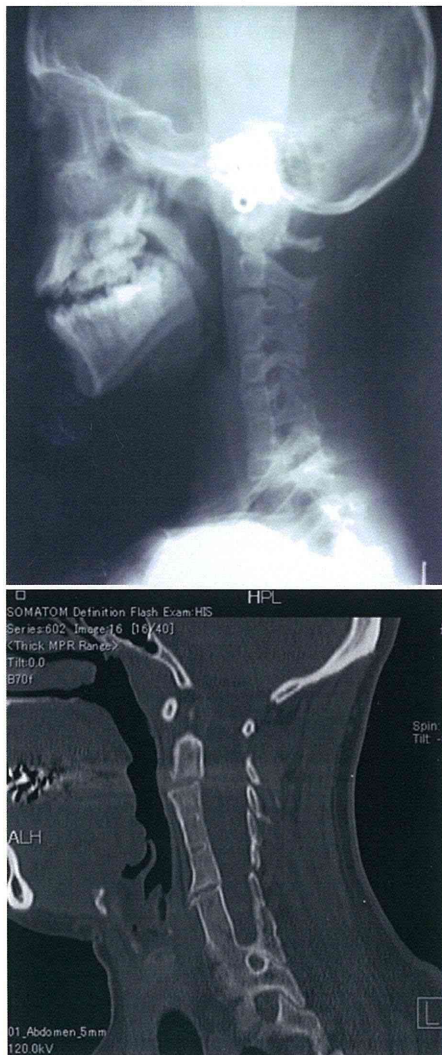
**Advice:** The first line of treatment is conservative symptomatic treatment of shoulder stiffness.

### Fig. 4 Cervical block vertebra

Cervical spine X-rays demonstrating the formation of blocks at C2–C4 and C5–C7.

Upper image: 1976 (Teikyo University Hospital)

Lower image: 2012 (National Center for Global Health and Medicine)





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### 5) Poor posture/kyphosis (hunchback)

Patients tend to bend their trunk forward to compensate for the impaired ability to reach for something (**to stretch out one's upper limbs to reach for something but cannot reach**) due to shortened upper limbs. This brings the head in front of the line of gravity, which places a considerable burden on the neck and shoulder girdle muscles (Fig. 5).

**Advice:** The posture should be corrected by occasionally lying on the back and placing the back of the head on the floor. Stretching exercises are also effective. The most important thing is to develop good lifestyle habits, such as avoiding overwork and stress, taking walks, etc.

### **Fig. 5 Kyphosis**

The X-ray demonstrates development of kyphosis in the thoracic spine, together with pronounced lumbar lordosis. Shoulder stiffness arises because the head is positioned forward of the body's line of gravity. Mild scoliosis is also evident.



## 2. Comments from Departments of Orthopedic Surgery and Rehabilitation

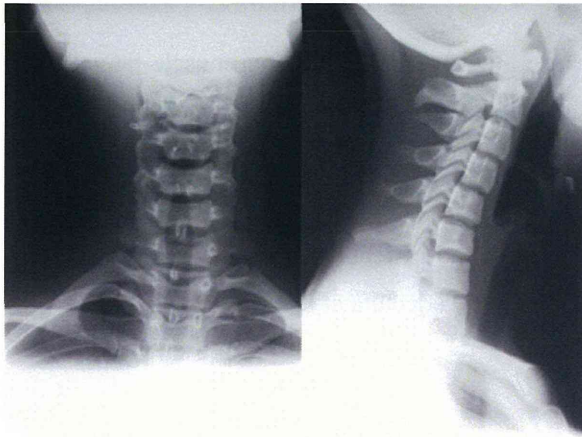
### 6) Droopy shoulders

Patients with 'droopy' shoulders (Fig. 6) are prone to develop shoulder stiffness when carrying bags or backpacks, as this stretches or compresses the brachial plexus.

**Advice:** Patients should avoid carrying baggage or heavy objects in their day-to-day life.

### **Fig. 6 Droopy shoulder**

Swan neck and droopy shoulders down to the 1st thoracic spine can be seen in the lateral view of the X-ray of the cervical spine. C4/C5 instability is also evident.



## 2. Comments from Departments of Orthopedic Surgery and Rehabilitation

### Q2-2: What causes low back pain?

- **Low back pain involving chronic muscle fatigue is becoming more common.**

Low back pain is divided into three categories, being either caused by metastatic cancer of the bones, pathologic fracture, infection, etc., associated with sciatica or sensory disturbance of the lower limbs, or involving chronic muscle fatigue. Low back pain involving chronic muscle fatigue is becoming more common among thalidomide victims. However, in some patients, it is associated with discitis. It may therefore be necessary to use diagnostic imaging such as MRI, if needed, to identify the cause of the pain.

Stress and overtiredness should be avoided, because low back pain involving muscle fatigue can be stress-related. Less common factors, such as scoliosis-related poor posture, spina bifida occulta and lumbarization of the sacrum can also be contributory factors.

#### 1) Scoliosis

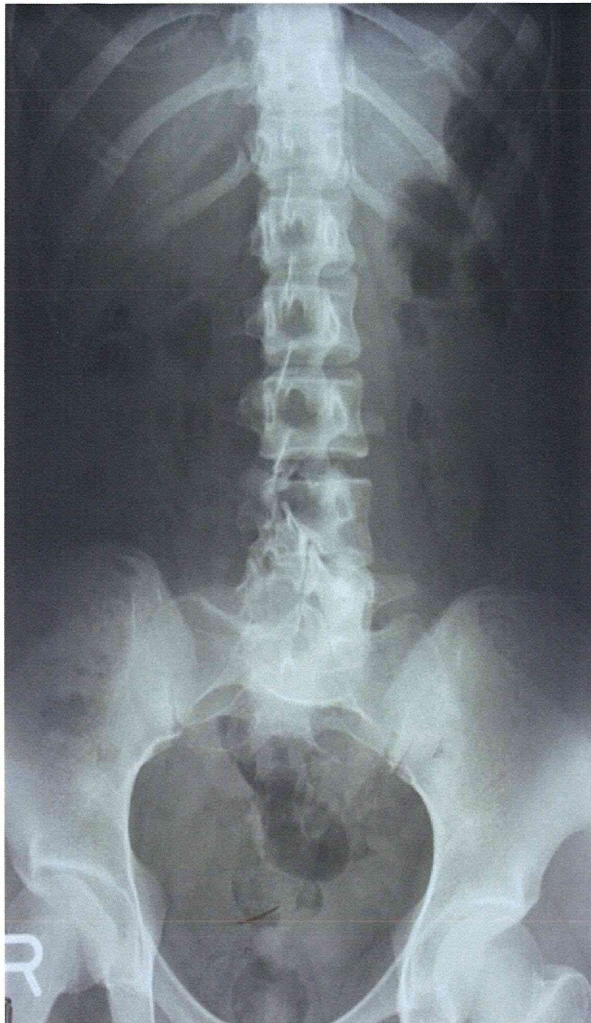
Scoliosis is a frequent complication in thalidomide-impaired patients, particularly scoliosis of the thoracic and lumbar spine. Some patients also have spina bifida occulta at L5 (Figs. 7, 8).

**Fig. 7 Scoliosis**



**Fig. 8 Scoliosis and spina bifida occulta**

The lumbar vertebrae are convoluted and spina bifida occulta is present at L5.



## 2. Comments from Departments of Orthopedic Surgery and Rehabilitation

### 2) Discitis

An MRI scan is necessary if low back pain is chronic and refractory. The patient is sometimes incidentally found to have intervertebral disc herniation and inflammation (Fig. 9).

#### **Fig. 9 Discitis**

The MRI scan shows degeneration of the intervertebral discs, with partial destruction of L2 and L3. Post-inflammatory soft tissue can be seen in the spinous process of the lower back.



**Q2-3: What are the main causes of hand numbness?**

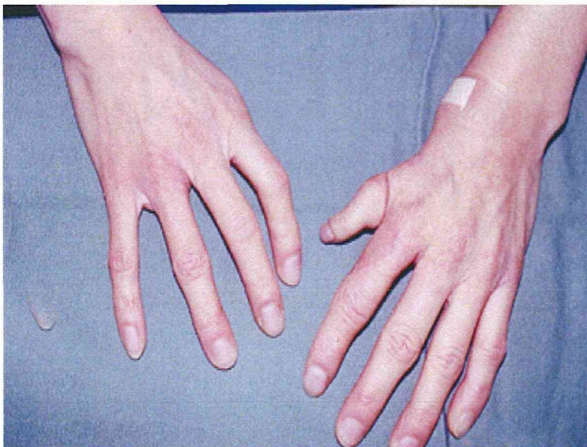
**Skeletal underdevelopment of the hand joints is accompanied by narrowing of the carpal tunnel, so that overuse of the hands leads to carpal tunnel syndrome.**

Until now, 12 Japanese thalidomide victims have undergone surgery for this condition, but the number of thalidomide victims affected by carpal tunnel syndrome is probably much higher, because many have not undergone detailed examination despite having hand numbness. This condition is seen in people with mild to moderate upper limb reduction defects (Fig. 10), of which there are about 130 Japanese patients.

**Treatment methods:** Firstly, the cause of numbness must be investigated. Nerve conduction in the upper limbs is studied by electrophysiological methods. Motor nerve conduction tests of the median nerve are difficult because of absence of the thumb or underdevelopment of the thenar eminence. The presence of a conduction block and axonal degeneration are investigated by inducing a sensory nerve action potential (SNAP) in the index finger via recording electrodes (Fig. 11). Intraoperative findings show that the median nerve is comparatively large because of the narrowness of the bones forming the carpal tunnel (Fig. 12). The distal end of the transverse carpal ligament distal to the constricted part corresponds to the site of abnormal conduction.

**Fig. 10 Absence or underdevelopment of the thumb**

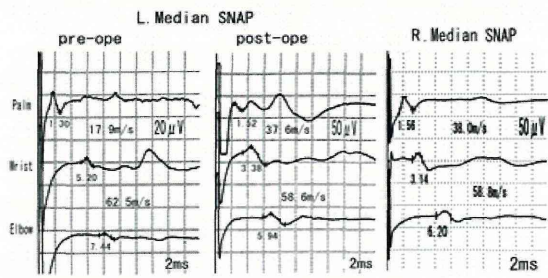
The left hand presents symptoms of carpal tunnel syndrome due to overuse.



**Fig. 11 Electrophysiological study findings**

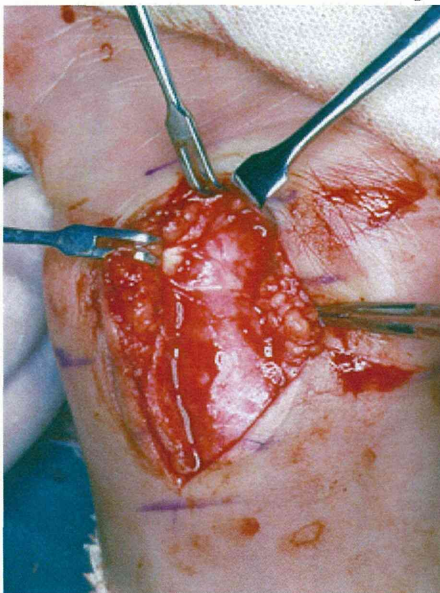
There is conduction block and conduction delay at the hand joint articulations in both hands, suggesting carpal tunnel syndrome. Conduction disturbance in the left hand joint articulations improved after transverse carpal ligament release surgery in this hand, which was more severely affected.

## 2. Comments from Departments of Orthopedic Surgery and Rehabilitation



**Fig. 12 Intraoperative findings**

The median nerve is relatively large, and hence, is easily mistaken for the flexor tendons of the hand joints, including the long palmar muscle. Care must also be taken to avoid cutting the recurrent branch of the medial nerve when its presence within the operative field is not clear.



## 2. Comments from Departments of Orthopedic Surgery and Rehabilitation

### **Q2-4: What causes persistent pain in the hands?**

**When there is underdevelopment of the musculoskeletal system, activities using the hands can quickly cause fatigue in the forearm muscles and intrinsic muscles of the hand, leading to tendonitis.**

Conditions that were observed, in order of decreasing frequency, included de Quervain's disease (tendonitis of the radial and dorsal sides of the thumb), trigger finger, lateral epicondylitis, medial epicondylitis, etc.

**Advice:** These conditions are hard to cure because it is difficult to restrict the use of the hands in daily life. Refraining from using the hands is the most effective therapeutic approach. Local corticosteroid injection into the tendon is another option, but the problem will immediately recur if the hands are routinely overused again.

### **Q2-5: What are the causes of hip joint pain?**

- **Patients with hip joint pain should be X-rayed to check for degenerative hip disease (coxarthrosis).**

Only 2 of the 309 Japanese thalidomide victims have clear underdevelopment of the lower limbs. However, a number of patients have hip joint dislocation and late-onset coxarthrosis associated with underdevelopment of the acetabulum. Hence, patients with hip joint pain should be X-rayed to check for coxarthrosis (Fig. 13).

Coxarthrosis becomes progressively worse with age, because the hip joints support the weight of the body (Fig. 14). Hip replacement surgery will remove the pain and improve the patient's activities of daily living. However, a number of thalidomide victims with upper limb reduction defects use their lower limbs to perform upper limb functions (Fig. 15). After hip replacement, these patients are therefore highly prone to dislocation of the artificial hip through adduction of the lower limbs.

**Advice:** Patients should thoroughly discuss their lower limb use with the orthopedic surgeon to determine whether surgical treatment is appropriate.



## 2. Comments from Departments of Orthopedic Surgery and Rehabilitation

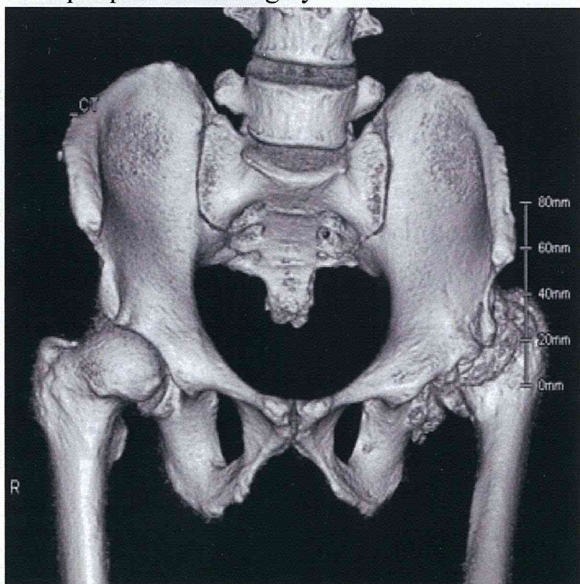
**Fig. 13 Underdevelopment of the hip joint**

X-ray of the lumbar spine and hip joints of a teenage patient. Both hips already display mild coxarthrosis.



**Fig. 14 Coxarthrosis**

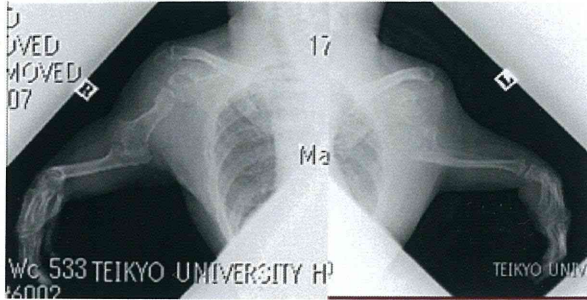
Left coxarthrosis has steadily deteriorated and the hip is dislocated. The patient would be indicated for hip replacement surgery.



## 2. Comments from Departments of Orthopedic Surgery and Rehabilitation

### **Fig. 15 Upper limb reduction defect**

The lower limbs have been used to compensate for the upper limb reduction defects. In such cases, hip replacement surgery would not be appropriate.



### 3. Comments from radiologists

#### Main authors

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**Q3-2: Sayuri Oka, Toru Sasaki, Tatsuya Wada, Kanehiro Hasuo**

**Q3-3: Kazuya Mochiki, Toru Sasaki, Tatsuya Wada, Kanehiro Hasuo**

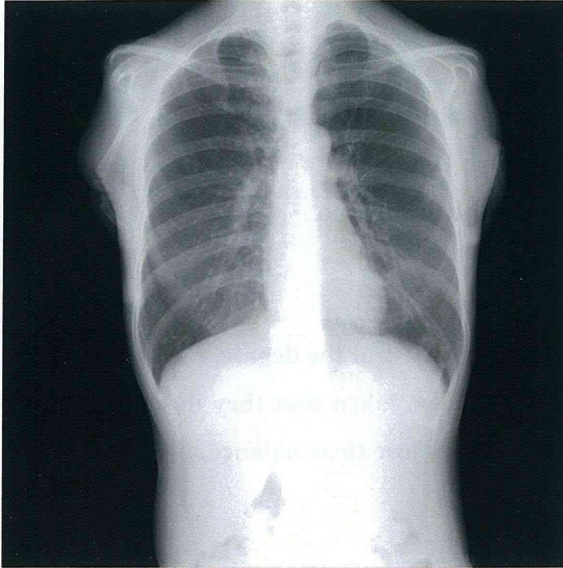
**Q3-1: What are the important points when taking X-rays?**

- **Patients have different degrees of impairment, but regardless of the degree, for patients with upper limb reduction defects in particular, care should be taken that they do not fall from the X-ray table or fall over when moving, because, if they lose their balance, they cannot use their upper limbs to support themselves.**

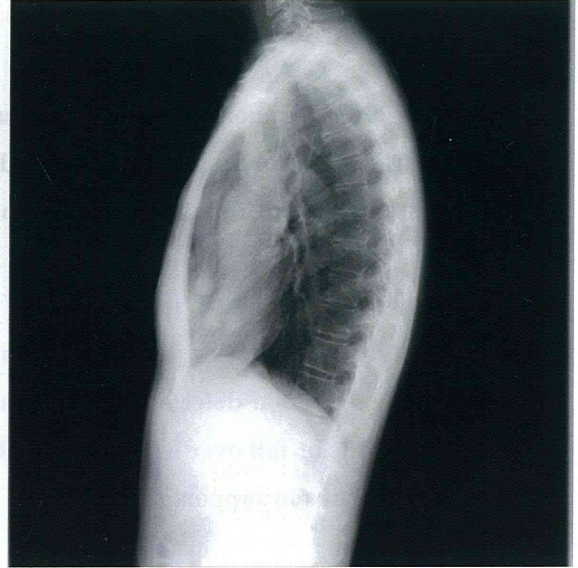
Many thalidomide-impaired people have had to undergo a great number of examinations at medical institutions from a young age. Some will therefore feel uneasy and more fearful or resistant than ordinary patients when attending medical centers, and should be treated with care and kindness in response to these fears. Care should be taken to not place too much burden on the patient when he/she is adopting the positions needed for X-ray, as this can easily damage the relationship of trust with the radiologist. Patients range from those with relatively mild impairments, who live independently and will require almost no assistance in changing their position, raising their arms, etc., to those with severe impairments who require help with most things, such as getting undressed and dressed, etc. However, whatever the extent of impairment, care should be taken that the patient does not fall from the X-ray table or fall over when moving, because if they lose their balance they cannot use their upper limbs to support themselves. Below, we describe the important points to remember when taking X-rays of the chest (AP and lateral), cervical, thoracic and lumbar spine in two planes, both shoulders (AP and Y view), hip joint (AP), both knees in two planes, etc., and when X-raying patients with impaired hearing.

### 3. Comments from radiologists

#### Chest X-ray



(Fig.1) Chest x-ray (AP)



(Fig. 2) Chest x-ray (lateral)

#### Chest AP image (Fig. 1)

The patient stands and places their chest against the X-ray plate.

The patient is asked to hold their arms out in front.

#### Chest lateral image (Fig. 2)

After the AP X-ray, the patient is asked to turn sideways and, if possible, to raise their arms as high as possible. Patients who cannot raise their arms by themselves need assistance.

If the arms are too short to be raised even with assistance, the patient is asked to hold their arms out in front as far as possible.