# TRANSCRIPT

**ROAD SAFETY COMMITTEE**

**Inquiry into motorcycle safety**

Melbourne — 6 March 2012

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Associate Professor M. Leung, director, plastic, hand and maxillofacial surgery unit, Alfred Heath, and director, plastic surgery unit, Southern Health.

**The CHAIR** — Associate Professor Leung, welcome to the public hearings for the Road Safety Committee's inquiry into motorcycle safety. We have received 74 written submissions since the release of the terms of reference and inviting submissions. The purpose of the hearings is to obtain evidence from selected witnesses covering the terms of reference. Hansard will be recording today's proceedings, and we will provide a proof version of the transcript to witnesses so any typographical errors can be corrected, following which they should be returned to the committee. We can take evidence in camera as well, which means it will not form part of the public record. But what you say here now, unless you indicate otherwise, will form part of the public record. But we can go in camera should you wish it.

I ask observers to respect the rights of witnesses and the responsibilities of the committee by keeping noise and movement to a minimum. I also ask everyone to ensure their mobile phones are switched off or on mute. As I indicated, you also have the benefit of parliamentary privilege for what you say during the proceedings. Before commencing, it would be helpful if you could introduce yourself to the committee for the benefit of Hansard. Could you also provide an address to which the transcript can be forwarded, which might be the Alfred hospital. Thank you, and we invite you to contribute. We will be asking some interactive questions, and I understand you have a presentation as well.

**Assoc. Prof. LEUNG** — Yes, thank you. Thank you, Chair, for inviting me to come. Michael Leung is my name. I am currently the director of plastic surgery at the Alfred hospital. I am also the director of plastic surgery at Southern Health, so that really incorporates most of the hospitals south of the Yarra. I am also the chief examiner for plastic surgery for the Royal Australasian College of Surgeons. I have been in plastic surgery, mainly in the trauma field, for over 20 years now. The patients we deal with are mostly involved in car accidents and work injuries.

I have prepared one presentation, basically just to inform the committee about the pattern of injuries that we see for patients who are involved in motorbike accidents. I am happy to give you a copy for the record, but you can see some of the patients full-face, and they will have to be protected if this goes onto the public record.

**The CHAIR** — Not to go into the public arena. Yes, we note that.

**Assoc. Prof. LEUNG** — Yes, just to protect their faces and so on.

**The CHAIR** — Yes, thank you.

**Assoc. Prof. LEUNG** — Would you like me to proceed?

**The CHAIR** — Yes, we are going to adjust the lights.

**Overheads shown.**

**Assoc. Prof. LEUNG** — I just want to say that some of the photographs are quite graphic, so they might upset some.

The injuries we see really cover the whole body and facial injuries, basically soft tissue injuries and fractures to the upper limbs. The brachial plexus is the plexus of nerves that come up from the spinal cord and they control the movement of the whole of the upper limbs. When a motorcyclist falls off their bike they have traction injuries to the neck and they pull the neck that way and the nerves actually pull off from the spinal cord. When they sustain these injuries they lose the use of their arms completely, and that includes movement and sensation. Obviously the fractures to the limbs and degloving means the tissue is pulled off from the bone because when they fall to the road the traction injury and the friction injury pull the tissue off. They are not cuts; they are just pulled off. When you pull the tissue off, the injury to the soft tissue is a lot worse than cutting. If there is cutting, you just join the thing up. When you pull, you damage the vessels and the nerves as well. So it is a lot worse than just a pure cutting injury — the degloving. The amputation applies to upper limbs as well, but upper limb amputation is a bit rarer. With the lower limb you can sustain the amputation because when they fall over, they can get run over by the vehicle that is involved in the car accident, and obviously there are the soft tissue injuries and the fractures as well. The rest at the top basically just goes through the pattern we see. These are all live pictures.

First of all on the soft tissue, the history of this man is that he was riding a motorcycle and he ran into the back of a truck which had a piece of metal sticking out. He was not wearing a full helmet — not a full frontal one — so his face ran into the pole. Apart from the soft tissue injuries — —

**The CHAIR** — Was it a horizontal tray out the back of the truck?

**Assoc. Prof. LEUNG** — I think it was actually a pipe coming out.

**The CHAIR** — A pipe.

**Assoc. Prof. LEUNG** — He has run straight onto it. Even though he had the helmet, there is a penetrating injury to the face there. There is the soft tissue injury that you see there and those are the fractures you get.

The treatment of this patient was primarily about the airway, because there would be a lot of bleeding from the fractures and also the soft tissue injury. Soft tissue bleeding can usually be controlled fairly well, but the bleeding from inside sometimes cannot be controlled. People can die from that sort of thing — just from the bleeding on the inside. The treatment for this sort of fracture is basically to reduce the fracture; it is to pull the fracture back immediately. And pulling the fracture back will stop the bleeding. If they cannot do it in the field, they have to put in a tube in to intubate the patient to protect the airway. Also, a significant number of these sorts of injuries will be associated with head injuries as well, so most of them are not isolated. With facial injuries a percentage have neck injuries and head injuries as well. That is just one part of it.

We cannot consider this sort of injury as being isolated; they could have limb injuries, trunk injuries, chest injuries and so on. Basically, I will limit my talk to what I see, but you have to consider injuries like these as a person, which will involve multiple systems as well. They rarely come as one system.

**The CHAIR** — Yes, thank you.

**Assoc. Prof. LEUNG** — And so, basically the first aid treatment is to stop the bleeding and when they come to the hospital the first thing is to exclude injuries to other systems like chest injuries and heart injuries — so not lifesaving. Then they come to theatre and we fix up the wound and try to reduce the fracture, but sometimes they might need multiple operations to do that. That is basically the end result we get after about three operations. They are not perfect; they have permanent scars. With those sorts of injuries sometimes they can lose their sight as well — their vision in the eye — but this person here was quite lucky, he did not. Apart from the permanent facial scarring he has, he has come out of this fairly well.

Sometimes you do not actually get soft tissue injury. When you hit on a blunt surface you just get fractures. It can be just a fracture without the soft tissue on top. Basically with this operation you can see all the plates we put in to fix the fractures. They usually recover quite well; the healing is usually quite good for face fractures so long as they are treated properly from the start.

More on upper limbs. A lot of them happen in young people. There is enormous soft tissue injury. This person fell over and the neck was pulled to the side and the arm went this way. When the arm goes this way, you actually pull out the nerve completely from the spinal cord. On our right side — on his left — you can see the contour of the shoulder. The muscle is all wasted. When you damage that plexus of nerves there, the muscle wastes away on the whole of the upper limb on the affected side and there is a loss of function and sensation as well.

**The CHAIR** — You used the term ‘plexus of nerves’.

**Assoc. Prof. LEUNG** — The brachial plexus. Brachial means ‘the arm’; the plexus is the plexus of nerves, and in the spinal cord level it is from what we call C5, C6, C7, C8 to T1. The five nerves join together to mix up and form different individual nerves to supply the shoulder, the upper limb and the forearm, and basically these types of patients come in completely paralysed in the upper arm. This patient actually had the accident in Tasmania. In Tasmania they do not have people who look after that sort of injury over there. The speciality is not there, so this type of patient is actually flown over to us for us to treat. This patient comes over every few months to be seen by us. He had chest injuries as well but as far as the limb is concerned he had all the operations done at the Alfred apart from the initial operations.

The thing is when I first started doing this sort of thing 20 years ago the treatment for this was amputation because the arm was totally dead, there was no sensation or movement, and they cannot treat it. It is just a dead weight hanging on the shoulder, so for young guys like this that is what they would do — they would amputate the arm. Since then we have been doing a lot more operations and research, and nowadays the results are actually fairly predictable. We can usually get the shoulder stabilised. With about 80 per cent of patients we can get them to bend the elbow and with further surgery we can get about 30 per cent of them to use the hand as well. We have moved a long way in the last 20 years in terms of the treatment of this type of injury.

That is basically an intraoperative operation showing the plexus itself. When we say the plexus it means that it is sort of joined together and individual fibres form the nerve here that goes across here. That is basically the bicep muscle that we see, and the goal is to supply the bicep muscle to flex the elbow. We can do a lot of nerve operations, and with this type of patient we tend to do it after he is stabilised, and within about six weeks or so we start to reconstruct them because for nerve injuries the earlier you reconstruct them the better the results you get. As far as the elbow fraction is concerned we can predictably, as I said, get about 80 per cent of the nerves back. But the hand is a lot worse because there is a much longer way for the nerve to grow down.

For this type of patient, as one of the primary inventors of this type of operation said, a little means a lot. If they cannot move their arm completely, even just to move their arm up means a lot. Even if they keep their arms, for a young person the body image is very important. But now we can actually get some functions back, and a lot of them can be quite useful because even though you cannot pick up phones or things, you can use that for support for the other arm. They are worthwhile things to do.

Sometimes when the nerve operation does not work because, as I say, there is a significant percentage of operations that do not work, we transfer some muscles from the arm. That is actually a muscle from the thigh, what we call the gracilis, which is the muscle that people who ride horses use to grip their horses. We transfer that muscle up to the arm to recreate the muscles there, and that allows the flexing movement. That is what is called part 1 of the Rambo operation because it was a big operation, and Rambo part 2 is supposed to put another muscle from the other thigh on the forearm for the hand movements. So there are a lot of big operations that we can do and the results now are a lot more predictable than they used to be about 10 years ago. On the whole, because they are young patients and because the consequence of not having an arm is so great, the operation is still worthwhile to do even though it is a big operation.

This man is a motorcyclist too. He has been a patient of mine for some years now and he told me about the way the accident happened. He was not riding fast at all but he ran into a four-wheel-drive with a rear-vision mirror with a bar coming out and the rear-vision mirror sitting on the side there. The car went in front and his arm actually went into that bar. The main thing he emphasised to me is that he wears a lot of protective clothing. He wears a full-blown helmet and the armour and things like that, so despite the severe injury to his arm he has no other injuries apart from that arm, but because the arm actually goes through that crossbar there it fractured the arm, ripped the tissue off and caused brachial plexus injury as well. This is how I first saw him. The orthopaedic surgeon has fixed the bone. That is the bar on top there. That is what we call the external fixature where we put some pins in to stabilise the bone because it is too dirty to put a plate inside the bone.

We managed to get the forearm healed completely. However, he is the one who had the brachial plexus injury as well, and, for a man of his age, the chance that doing the operation would make it worse is a lot less. After a lot of discussion he decided to have an amputation of that arm. An amputation is not a simple procedure because you want to have a stable stump and you want to have the same-sized stump as well. Despite the fact that it does not look good, we managed to put all the sensate skin up so he can actually feel it.

Nowadays the new thing is to put a titanium implant into that bone so that he can have an electric arm and also nerve control. It is way down the track at this stage but we are starting to do that now. In fact the Alfred is the only hospital in this country that can do that in terms of putting the titanium implant into the bone so that the prosthesis joins to that implant. The implication of that is that down the track we can dissect the nerve out when they first come in, and with electrodes coming out through that implant can supply individual bits. So that is down the track but there is a lot of research going on and currently the team at the Alfred is the only team that is accredited from Sweden to do that operation here in Australia. It is an operation that has not even been done in the United States yet, basically only in Europe and in this country.

This is an arm there. If we move down there, as I said, it is a degloving injury. Sometimes if people do not wear gloves and they fall over, the hand just grinds on to the road, so tissue is just ground off. It is not cut; it is just destroyed. This is a young lady with a hand like that. Even though it is like that because the injury is mostly on the back they still work hard to save it because most of the sensation on the front can still be used for support, and it is better than a prosthesis. She underwent about three operations or so. They never look good; we put the muscles in there to cover it up. It is functional, it is working but it does not look good at all.

Sometimes the soft tissue injury might not be that bad but sometimes they can have a lot of bone injury. In this man the soft tissue injury is not bad but the bone injury is a lot worse — he actually lost most of the bone in the forearm. This is the X-ray of the pictures; you can see that the bones inside are in bits. The orthopaedic surgeon just cannot stabilise it. So we transferred the fibula, which is the bone from the leg, up to the arm to reconstruct one of the arm bones. This is the bone itself, the fibula from the leg, together with the skin and the blood vessels that supplied it, and we joined it up to the arm using microsurgery. This operation would normally take about 8 hours or so.

**Mr LANGUILLER** — Doctor, if I may interrupt: would you know which one of your patients was wearing protective gear and on what parts of the body?

**Assoc. Prof. LEUNG** — The girl has — the last patient — but the man with the amputation came especially to talk to me about what sort of gear he wears, and he wears a full-face helmet.

**Mr LANGUILLER** — What about the one that lost most of his bone in the elbow?

**Assoc. Prof. LEUNG** — No.

**Mr LANGUILLER** — He was not?

**Assoc. Prof. LEUNG** — No. There is another patient, which I show down the track there, who wore everything, so she had minimal other injuries except that fracture in the foot there.

The bottom line from what I see from all these patients is: the more you wear, the better in terms of protection. A full-frontal helmet is better than just a side one without a frontal one. That is my impression.

The skin in this slide is from the leg, transferred up there with the bone inside, so we used the bone to replace a bone in the forearm. This slide shows the bone we put there.

In terms of the lower limb, obviously you can get amputations. We see a few of those — the bad ones that come in. There is nothing you can do in terms of putting the foot back.

**The CHAIR** — That was an on-road amputation?

**Assoc. Prof. LEUNG** — On-road amputation, yes. Even then, amputation does not mean that you do not do anything sometimes. A lot of the time they have got grown over in the middle section and the foot is still good. Sometimes we take the skin in the foot and join it up to the leg there, because for patients like this below-knee amputation is very different from above. Below the knee is tonnes better in terms of these people being able to run, whereas above knee it is much harder to become active. For a young person we try ways and means to keep the amputation below the knee. Sometimes the injury can be quite near to the knee and they have enough length to support the prosthesis, so we put a lot of tissue there to build that up to convert it to below knee, the amputation.

This slide shows a similar type of injury — has not lost a leg, but there is a lot of soft tissue and bony injury. Obviously because of the road injury it is quite dirty and you cannot put the internal plate on that straightaway, so you have got to put the rings on the outside to stabilise the leg first. The injuries of that patient are not short term. It is not just to fix it. It is long term — a lot of these patients are still coming back after 10 and 15 years. Eventually some of them will end up having an amputation, despite the fact that you can save that leg.

This slide shows a degloving injury — the tissue just got pulled off completely.

This is a lady I am still treating. She is a lady who wears a lot of protective gear, so all she ended up with is the fracture, and inside the soft tissue injury is not bad. But still, the fracture inside there is so bad. As you can see,

there is no protective gear. She would have a lot more and she would not lose that leg. At least she has got the leg. She is a young lady, and we bring that to transport the bone — to move the bone down.

As far as I understand it, protective gear is very important, as is the full-frontal helmet. The more you wear, the better.

This slide shows the man who had the amputation. He has actually gone back to riding his bike. That is how they feel about their riding. This is a picture they took recently and gave to me. He is riding a bike using one hand only.

That is the end of my presentation, Chair.

**The CHAIR** — Thank you very much for your insight and the medical work that you have undertaken on behalf of many people who have been severely injured on Australian roads.

**Assoc. Prof. LEUNG** — Thank you.

**The CHAIR** — In light of your medical experience and forefront treatment, do you have any comments additional to the ones you have made about the value of protective clothing? At the moment in Victoria it is only compulsory to wear a helmet — that is the only device — and even there a full-face helmet is not a legal requirement. Do you have any commentary there regarding protective clothing?

**Assoc. Prof. LEUNG** — From the patients I treat, I think a full-frontal helmet is a lot better than just the side helmet — from the patients who we see in terms of the frontal injury, the facial injuries they get, and in terms of the rest of the body, gloves. You see people who are riding their bike on the road wearing shorts and sandals. That really is not on, to me. It does not have to be a high-speed injury. Even a low-speed injury — if they fell over — combined with the speed of the vehicle that was involved and the speed they go — can be quite catastrophic. To ride a motorbike with no protection should not be allowed on our roads, really.

**The CHAIR** — In broad terms, would you have treated 25 motorcycle injuries in your career or 100 injuries?

**Assoc. Prof. LEUNG** — It would be more. Currently we have four severe injury patients at the Alfred just this week. I would say about easily 25 a year, so over 20 years it would be more than 500-plus at the two hospitals in Southern Health. Most of the severe injuries would come to the Alfred, so I think most of the severe injuries would be treated at the Alfred. Over the years I would have treated more than 500.

**The CHAIR** — We saw the person who went back to riding after having had the amputation. Do you have an awareness of the reaction of people who have been injured in terms of their injury and desire to resume riding?

**Assoc. Prof. LEUNG** — He is one of the rare ones. Most people who sustain severe injuries like this do not go back to riding, and some of them cannot even walk. The one I showed you is very rare. Obviously it varies from one patient to another, but this guy has a very positive attitude. He decided on the amputation first off because he wanted to get on with life, but a lot of the patients we see do not do that, because it is not just a physical injury. We are dealing with the psychological injury and the impact on the families as well. You have to take that into account in the consideration. You cannot just look at the injury on its own. The implications for the family and the subsequent life the patient leads need to be looked at as well, apart from the injury sustained at the time.

**Mr LANGUILLER** — Going back to neck injuries, I saw in a Spanish program — I have mentioned this to my parliamentary colleagues — a helmet with a safety mechanism the same as we would have in cars, an airbag type. It holds the neck totally straight. It expands onto the back very quickly so the neck or the head is not able to do that movement. Would that be of any use? What do you think? How many injuries are there in terms of people literally breaking their necks, if I may use plain English?

**Assoc. Prof. LEUNG** — I am not qualified enough to answer that question, because my colleague who is coming tomorrow to present her experience — she is a spinal surgeon. She would be a more suitable person to answer that question. From the patients I see, I think that is probably a good idea, but whether it is feasible to legislate it to be put on everyone — —

My impression is it probably does help. From what I see from motor vehicle accidents over the years, 20 years ago when seatbelts were not compulsory, the injury pattern that we saw was a lot worse. For facial injuries, the head goes through the windscreen and all that sort of thing. It is a lot worse. When restraining devices and seatbelts came in with airbags and so on, we saw a lot less of those injuries. The extension of that — to what you said — is that it probably would help, because there is some restraining and some protection around the area, and the motorcyclists basically have not got any protection around them, and that is why protective gear would help them to protect themselves somewhat. The more there is, the better, but how feasible it is I cannot answer.

**Mr LANGUILLER** — Thank you.

**The CHAIR** — Do you have any general suggestions of what might reduce the level of motorcycle trauma in the community? Is it a matter that among your colleagues you have reflected upon? Do you have any insights?

**Assoc. Prof. LEUNG** — First of all, if possible to stop people riding motorbikes while wearing sandals and no protective gear. That really is not on. A full-frontal helmet is better than a simple helmet. The more protective gear you wear, the better. Again, that is up to the individual, but certainly not riding a motorbike with shorts and sandals and no helmet. Even a simple helmet is not good enough.

**The CHAIR** — You mentioned sandals. In the pictures we have seen arm injuries, head injuries and a lower leg injury. Is there a particular range of injuries you are aware of through riding with sandals?

**Assoc. Prof. LEUNG** — Mostly it would be lower limb when you wear sandals. The foot usually gets mangled because there is a lot of soft tissue loss as well. It is sort of worse than what you see there. The last patient I showed, if she had not worn proper boots and so on she would have lost that foot.

**The CHAIR** — Have you had a chance to look at the terms of reference of the inquiry at all?

**Assoc. Prof. LEUNG** — No, I sort of read through them.

**The CHAIR** — Do you have any other suggestions regarding training? We have covered protective gear to a certain degree. You have advanced a view in relation to protective gear that people should not ride with just sandals or in shorts. That could mean a protective boot. There are Kevlar pants which are a heavy-duty trouser, so to speak, that is resistant to being cut upon immediate impact with a surface. There are obviously jackets and there are back brackets in jackets as well that can provide some spinal support. Have you any comment on the range of clothing that it might be desirable to mandate, balancing the freedom of the rider with the types of cases you are required to deal with?

**Assoc. Prof. LEUNG** — No, not really. I do not know much about the things you mentioned, but I talk to riders and they say the expensive ones are a lot better. I do not know how expensive they are. There are some good ones and some bad ones in the market and the rider that I showed here got most of his stuff from overseas and he said it is a lot better. I really cannot comment too much on that.

**The CHAIR** — Have people commented on the fact at any stage that they were wearing protective gear but it did not withstand the degree of impact, where it was shredded?

**Assoc. Prof. LEUNG** — It is not uncommon to hear that if they had not worn protective gear their injuries would have been a lot worse. Even had they worn it they would still have had a lot of injuries, but if they had not worn it their injuries would have been would be miles worse than what they have. I do not think protective gear would stop them from having injuries, but it would minimise the injury; that is all.

**The CHAIR** — I might help you go through some of the terms of reference now. Are there any trends you have become aware of, vis-a-vis off-road patients coming to the hospital?

**Assoc. Prof. LEUNG** — Not in terms of motorcyclists. I have seen the trend for motor car drivers because of the changes that have been put in place over the last 20 years or so, but as far as motorcyclists are concerned I really do not see any changes. This might be the start of it.

**The CHAIR** — With the changing face of motorcycling are you aware of any other patterns that might come before you?

**Assoc. Prof. LEUNG** — No, not really.

**The CHAIR** — There is an issue regarding drugs, alcohol, travelling at inappropriate speeds, use of protective clothing and fatigue. Are there any generalisations or conclusions you might draw from people who have presented to you in terms of the nature of accidents?

**Assoc. Prof. LEUNG** — Certainly most of the riders are in the younger age group and not infrequently they are involved in speed. As far as drugs and alcohol are concerned, my impression is that they are not that common. Speed is the main thing for them.

**The CHAIR** — Going down to term of reference (g), are you aware of any countermeasures applied in other jurisdictions that might improve safety outcomes from a surgical perspective?

**Assoc. Prof. LEUNG** — No, I am not aware of any.

**The CHAIR** — What toll do you, broadly in terms of the profession, feel from this type of road trauma. I will put it another way: what toll does motorcycle trauma visit on the professional carers — the magnitude of trauma that comes through the emergency department?

**Assoc. Prof. LEUNG** — By toll do you mean the amount of work we have to put in?

**The CHAIR** — We can categorise that in a number of different ways. More immediately, the cost to the community in terms of the personal trauma, and then in a wider sense the cost to the community through the hospital — the volume of work and the cost to the community.

**Assoc. Prof. LEUNG** — Initially what we see are the types of injuries that come in, the cost involved in looking after them, also the impact on the family and the patient. But I do not think we have been looking into the impact on that person. They might not be able to work for the rest of their life and there is the impact on the family and the subsequent operations that person may have. I do not think there has been any long-term study into the impact of that on their way of life and the cost to society. I do not think that has been done. But certainly there is a lot of impact that we do not know about. It is not just the injury itself.

**The CHAIR** — We had evidence given to us by the head of the trauma unit at the Alfred earlier. He showed a fellow in his 50s who was on his way down to Phillip Island on a Friday afternoon and 4 hours later was in the Alfred hospital with paraplegia, if I recall correctly. His whole life had been changed in a matter of minutes. Is that an issue on which you have an allied role in dealing with family members and individuals?

**Assoc. Prof. LEUNG** — Yes. A lot of these injuries would lead to the family breaking up. It is not uncommon to see that at all. Also, with the severe injuries we get, very few of them would go back to work, so there is an impact on society from that aspect and obviously on the rest of their family as well. It does change things; the accident and injuries change their lives.

**The CHAIR** — I think that is probably a review of the terms of reference that might be roughly applicable to your arena of observation. Our task as a parliamentary committee is to take on board evidence from stakeholder groups — from the motorcycle manufacturers, from the police who are law enforcers, from those who are training, from the manufacturers of the safety equipment for motorcycles — and balance the competing aspirations at one level for good law enforcement and at another level for those people who like to go for a weekend ride; and also balancing the different stakeholder perspectives in aggregate terms to produce recommendations which might, if adopted by the government, lead to a change in law. Are they any changes to the law which you as a citizen and someone who has an acute insight from the trauma side of the equation might regard as being a worthwhile initiative?

**Assoc. Prof. LEUNG** — I think I would legislate that people should not be allowed to ride a motorcycle without appropriate protective gear and should wear shoes. A full-frontal helmet would be good, if possible. I think that is about the limit. The rest of it is speed and education, that sort of thing; that goes without saying. In terms of the legislation, again it is not to wear shorts and sandals to ride a bike. Obviously there is the speed as well, but the police would be better people to speak about that.

**Mr LANGUILLER** — What about the average time of recovery? You have shown a few case studies of soft tissue injury in particular and muscles, tendons and so on. What is the average?

**Assoc. Prof. LEUNG** — When you define the term of recovery, treatment of these kinds of patients will take years, not months. We can get them out of the hospital. Probably within about three to four weeks they are good enough to go home, but you cannot consider that recovery. A lot of them will need subsequent operations as well. If you consider this kind of patient and how long it is before they can go back to work, you are looking at least two to three years.

**The CHAIR** — We thank you very much for your time — the time taken to prepare your presentation and the time you have allocated out of a busy professional life to appear before the committee. The skilled insights you have presented to us have been illuminating. We have been keen to gain an insight into the trauma end of the equation to see the outcomes for people who may have been riding with insufficient protective clothing. We were particularly interested in finding out what was involved at the treatment end of the injury rehabilitation process.

**Assoc. Prof. LEUNG** — Thank you very much for having me.

**Witness withdrew.**