

# Muscle model assists kids

by Cameron Broadhurst

The treatment of cerebral palsy could be transformed through research being conducted at the Auckland Bioengineering Institute into the complicated anatomy of human muscles.

Among the team modelling the

human musculo-skeletal system in the international physiome project is Swiss student Katja Oberhofer.

She is working on a computer tool to assess how human leg muscles contract and lengthen when walking.

More than 7000 New Zealanders and countless people worldwide have trouble walking

normally because of cerebral palsy.

Dr Kumar Mithraratne, Oberhofer's supervisor and a musculo-skeletal researcher, says the neuromuscular disease stops muscles voluntarily contracting, a problem surgeons attempt to fix by cutting fibres to lengthen the muscle.

Currently there is no way to directly measure muscle length during walking.

Oberhofer's thesis project is specifically aimed at telling surgeons more about how children with cerebral palsy move, and which muscles to target for surgery. She says she hopes to have a working tool by the end of her thesis, in the next three to four years.

Yet the research has implications beyond just cerebral palsy. Oberhofer says it could apply "wherever you are interested in locomotion", from knee and hip replacements to coaching sport.

While the study of walking, or gait analysis, is commonplace in fields as diverse as shoe design and computer games, Oberhofer says the current methods lack necessary detail because they are only taken from skin points.

Surgeons working from a stick-figure type model then have to estimate which muscles to operate on.

Her tool will use MRI images to flesh out points throughout the muscle mass, giving patient-specific detail which can be matched to an existing generic model.

The generic musculo-skeletal model is based on data from the donated body of an executed American prisoner.

The data, collected through the Visible Human Project, is made up of more than 1800 cross sections at one millimetre intervals, taken from the corpse and

digitised to create maps of the whole human body.

Oberhofer has already taken MRI scans of her own legs to work on, but doesn't yet know how the leg muscles of children with cerebral palsy will be different to those of the generic model.

"We don't really know their anatomy. We don't know if they have huge deformities or not," she says. "It's computationally really, really big."

When testing begins in October, 12 children with cerebral palsy and 12 without will be scanned and analysed over the course of two years to create patient-specific models.

Dr Peter Hunter, director of the institute and overseeing most of the work on the Physiome Project, says models are never finished: "You just keep on improving them."

He says the idea is "to make use of the information that's obtained from those children to make better surgical decisions".

But Oberhofer says if the patients do differ significantly from the generic model, assessing them will be a lot more complicated.

Associate professor of paediatric orthopaedic surgery, Susan Stott, works at Starship Children's Hospital with children who have cerebral palsy.

She says the computer methods of gait analysis now in use take account of different weights and heights, but don't use patient-specific models of legs and body.

Stott says it is impractical to carry out an MRI scan on every patient, but hopes the research will help adjust the models according to patients' ages and specific problems, and aid surgeons in predicting how much individual patients could benefit from surgery.

# NZ falls behind on skin cancer efforts

by Rob Bridgman

Skin cancer experts claim New Zealanders lag behind Australians in preventing and detecting the most common form of cancer among 20 to 40-year-olds — melanoma.

Cancer register data from the Ministry of Health suggests winter melanoma detections have increased by 25 per cent over the past few years, with 54 per cent of advanced melanomas being reported in the winter and spring months.

Toni Dale, SunSmart school programme coordinator, says New Zealanders are starting to take skin cancer seriously but are still "decades behind Australia".

"One contributing factor to the high number of cases is our cool temperatures but high UV ratings," she says.

"That combination allows people to stay on our beaches all day, unlike Australia where it's simply too hot to do that."

Dr Judith Galtry of the Cancer Society says New Zealand's high ultra-violet environment is responsible for 90 per cent of skin cancers.

"We are applying a number of policies in schools as evidence shows high exposure at an early age is a major risk factor later in life," she says.

Melanoma is the number one cancer for people aged 20 to 40 years, killing about 300 New Zealanders each year.

"It's a major problem facing New Zealanders and we have one of the highest skin cancer mortality rates in the world," she says.

"One trend we are seeing is people with darker skin who believe they do not need to protect their skin and therefore are less likely to check themselves," she says.

"When they do end up in our hospitals it's often too late."

Nearly 1000 people were diagnosed with melanoma last year, more than half of them male.

"Men have a lower standard of body awareness compared to women and often have the 'she'll be right mate' attitude," says Dale.

"Therefore they won't present something odd on their body until it's too late."

The repercussions of such cultural attitudes cost New Zealand's health system \$33 million each year in skin cancer treatments.

Dr Galtry says recent summer campaigns have shown an increase in sun awareness.

But Dale says New Zealanders still are not aware they need to properly protect themselves.

"The loss of human life and the cost to our healthcare system is a major problem that still needs attention."



PHOTO: CAMERON BROADHURST

MAKING MOVES: Katja Oberhofer's thesis to target walking.

# Kiwi tourists bring home baggage

by Jessica Skinner

Increasing numbers of New Zealanders are returning from holiday with much more than a suntan and souvenirs.

Figures show there has been a significant increase in New Zealanders contracting HIV through unprotected sex while overseas on holiday or on their OE.

Of 73 heterosexuals diagnosed in 2005, 88 per cent contracted the potentially deadly virus overseas.

This is compared to 74 per cent of homosexual men who are infected in New Zealand.

New Zealand is in the middle of an increase in the number of people being diagnosed with the HIV infection.

While men who have sex with men remain the single largest group with the HIV infection in New Zealand, there has been a significant rise in heterosexual people diagnosed.

Figures from the AIDS Epidemiology Group at Otago University show a significant rise in those infected with HIV

and AIDS in the last few years.

To the end of September 2005 a total of 2417 people were recorded as living with HIV in New Zealand and a total of 884 people were notified as having AIDS, the immune system condition which can follow infection.

Chris Banks, communications coordinator of the New Zealand AIDS Foundation, says that the virus is becoming an increasing problem.

"The situation is quickly getting out of control."

Jane Bruning, national coordinator of Positive Women, says apathy is part of the reason for the steady increase in heterosexual contraction.

"Many think that AIDS is a disease that only affected the gay community in the 1980s.

"They think that it's no longer around except for in Africa and Third World countries and can't affect them in New Zealand."

Positive Women and the Family Planning Association have recently collaborated in the "well packed" campaign which encourages young travellers to carry condoms.



PHOTO: HELEN TWOSE

MISSING LUGGAGE: Travellers are forgetting to pack condoms.

Sue McAllister, of the AIDS Epidemiology Group, says new immigrants from countries with a high AIDS rate help to account for the growing heterosexual HIV numbers in New Zealand.

She says that proportionally New Zealand's HIV numbers are low in comparison to other developed countries such as Britain and the United States.

However, she says the fact new HIV infections continue to

rise is worrying.

Bruning says that growth is "upsetting" because in many counties it has stabilised or is in decline.

"Around 2000 New Zealanders know they have HIV. I wouldn't be surprised if there are 2000 more who don't know they have it."

About 40 million people in the world are living with HIV infection or AIDS.