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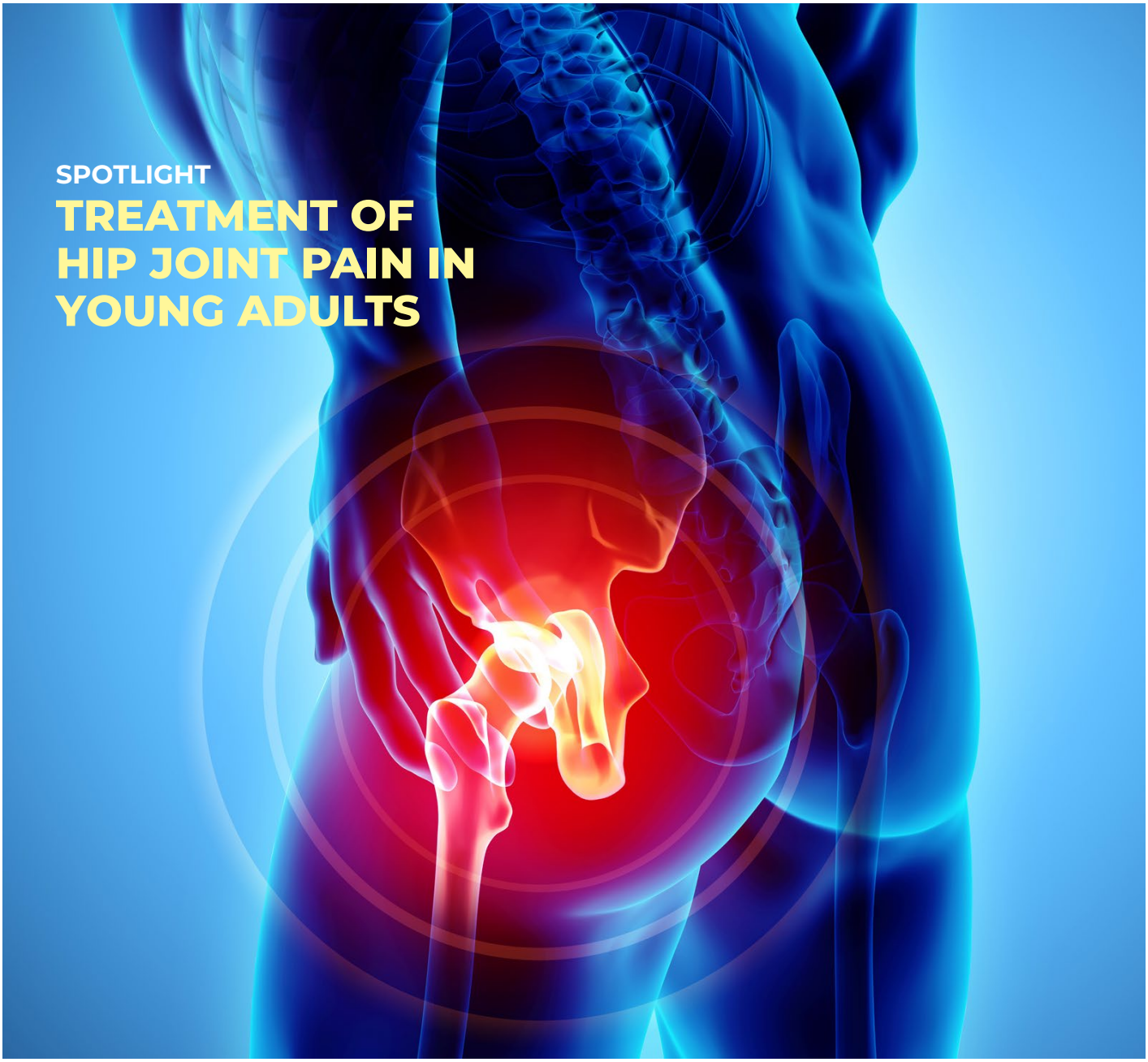

SPOTLIGHT

## TREATMENT OF HIP JOINT PAIN IN YOUNG ADULTS

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# IN THIS ISSUE

# TREATMENT OF HIP JOINT PAIN IN YOUNG ADULTS

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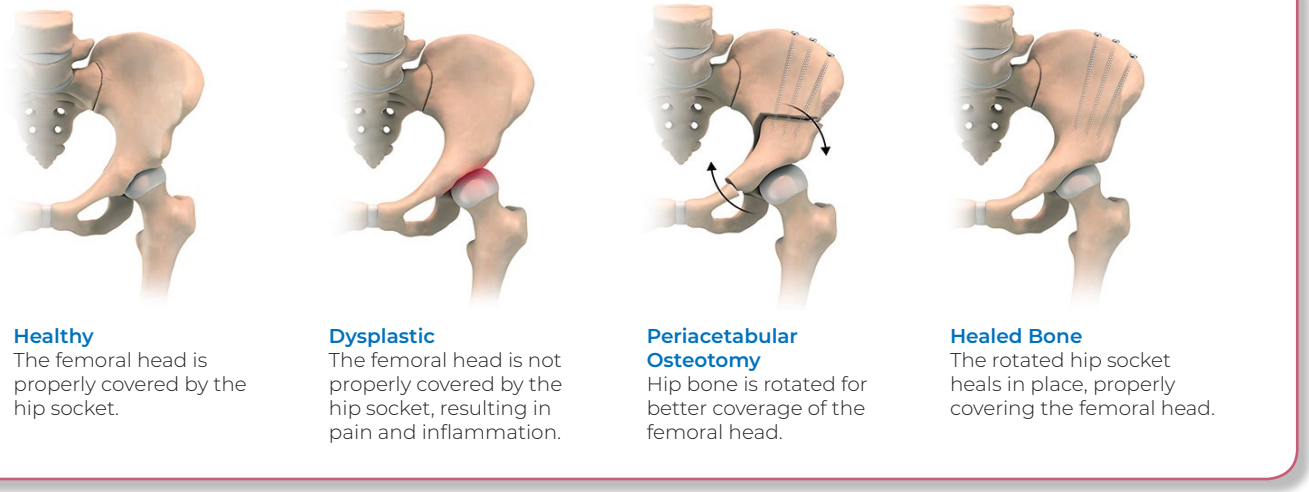
Hip pain is common in the middle-aged and elderly, with the most common cause being primary hip osteoarthritis. However, secondary causes of hip arthritis do exist, such as those related to Avascular Necrosis (AVN), trauma, or dysplasia.

Dysplasia of the hip can also result in hip pain in the young adult population and is being increasingly treated by orthopaedic surgeons.




Credit: www.childrenshospital.org

Hip dysplasia may affect 1 in 1,000 newborns and can range from frank dislocation of the hip to enlocated hips with mild morphological changes. Dislocated hips are usually picked up early in life and are treated in infancy, but mildly dysplastic hips may have minimal radiographic or clinical abnormalities. Such dysplastic hips may exist from an early age but may not present as an issue until young adulthood.

The acetabulum is typically shallow and the femoral head may be aspherical. This may result in uneven loading of the hip joint with some areas taking more stress than others. This can lead to labral damage and even arthritic changes. Such a patient may present with groin pain, a Trendelenburg gait, or a difference in hip range of motion from the other side. The natural history is that 25-50% of patients with dysplastic hip will have radiographic changes of arthritis by their fifth decade of life. Hip replacement is a viable option for a degenerate hip in the elderly, but this option may not be suitable for a young adult. Complications of total hip arthroplasty in a patient with dysplastic hip are also higher than in a typical patient with hip osteoarthritis.

The UK National Joint registry data shows that the revision rate for a primary total hip replacement is between 5 to 10% at 15 years from the procedure. Breaking down by age, the revision rate for those who had a hip replacement under the age of 55 is twice as high compared to those in their 70s and beyond. This is not unsurprising given that younger patients are more active and have many more years of life ahead of them.

## HOW DO WE TREAT A YOUNG ADULT WITH HIP PAIN?

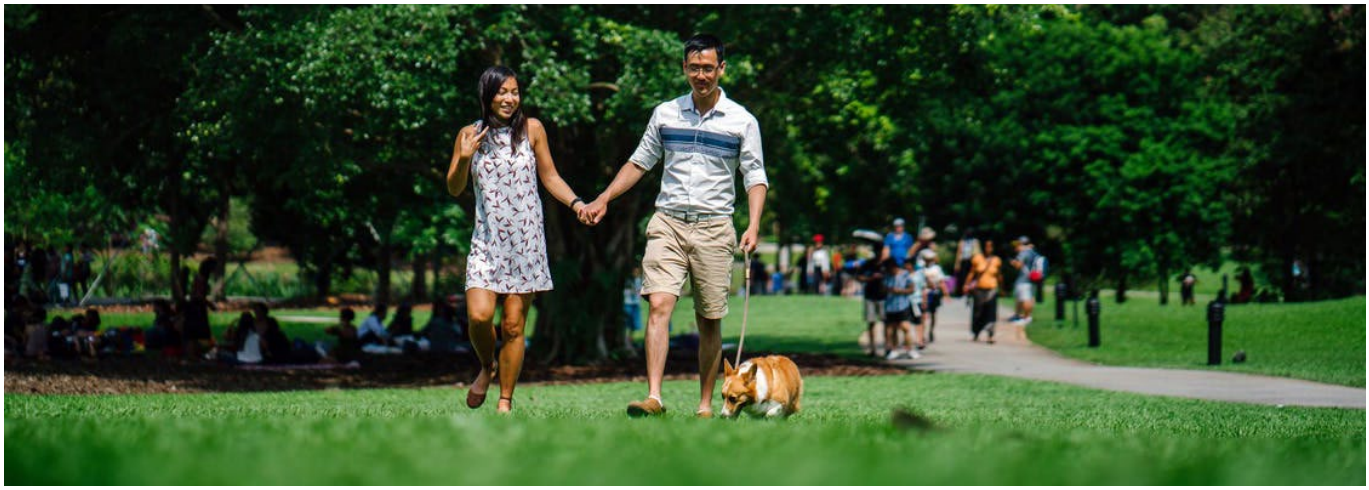
The aim is joint preservation, and this can be done through surgical means to delay a potential hip replacement in the future.

The strategies employed should improve the congruency of the hip joint. These may be achieved through an osteotomy of the proximal femur or the acetabulum. The popularity of acetabular osteotomies has increased over time. These are demanding procedures and are usually performed in tertiary centres where the appropriate expertise is available.

Acetabular osteotomies require bone cuts made around the acetabulum to allow it to be manipulated in multiple planes to increase the coverage of the femoral head. Screws are then inserted to maintain the new position and patients are protected from weight-bearing until there is adequate bone union. The Ganz osteotomy is unique as it redirects the acetabulum while preserving part of the pelvis posterior column, ensuring a more stable pelvis.

The results of this osteotomy are promising with around 90% survivorship* at five years from surgery and around 80% survivorship at 10 years from the periacetabular osteotomy. (**Survivorship refers to the patient not requiring additional procedures such as a total hip replacement*)

Hip arthroscopy to manage labral and cartilage damage may have a role, but seldom as a sole treatment. They may be a useful adjunct to pelvic osteotomies as they assist with treatment of a pain generator, but cannot offload the hip from abnormal weight distribution.



Developmental dysplasia of the hip is not the only cause of hip pain in young adults, as the femoral head may have deformed due to conditions like Perthes disease, slipped capital femoral epiphysis (SCFE), AVN after trauma, or after childhood hip sepsis.

These patients may present with femoral acetabular impingement (FAI), and a restricted range of motion. Surgeries can be performed to redirect the position of the femoral head via proximal femoral osteotomy. Cam lesions (bony bumps on the femoral head/neck) can be removed through arthroscopic resection, or open surgery with safe surgical dislocation of the hip.

These options can significantly improve the quality of life of a young adult by allowing them to participate in activities that require more range of motion – such as riding a bicycle or bending down to tie a shoelace.

This field of joint preservation is relatively new and growing, with advances in surgical techniques and planning. For instance, 3D reconstructive scans and 3D printing have offered better appreciation of the anatomical abnormalities that need to be addressed, while intraoperative CT imaging with the O-arm allows real-time computer navigation of screw trajectory when stabilising a pelvic osteotomy.

The rehabilitation after hip joint preservation surgery where osteotomies are involved certainly takes longer than after a total hip replacement. After a hip replacement, patients are allowed to fully weight-bear through their implants, and range of motion progressively improves over time.

Hip preservation surgery may require a period of limited weight-bearing as bone healing at the acetabulum or proximal femur osteotomy takes several months, with patients taking half a year before they are capable of sporting activities. Fortunately, most young adults are mentally and physiologically capable of undergoing these procedures and the prolonged rehabilitation.

Hip preservation does not 'burn bridges' for a future total hip replacement, and in some cases where hip preservation has normalised the hip joint anatomy, joint replacement may be technically less challenging.

All young adults with persistent hip pain should be evaluated by an orthopaedic surgeon. Careful physical examination and select investigations such as radiographs, CT scans, or MRI scans may help to evaluate the cause and differentiate intra-articular hip joint pathology from extra-articular pathologies. The latter includes conditions such as trochanteric bursitis, iliopsoas tendinopathy, iliotibial band syndrome or even referred pain from spinal pathologies, and these require different treatment modalities and not major hip reconstruction.

*The good news is that we now have better understanding and treatment options for hip joint pathologies in young adults. Although such pathologies discussed in this article make up a small proportion of orthopaedic consultations, the ability to provide surgical solutions has transformed the lives of many young adults and allowed them to live life with comfort and independence.*

# ROBOTIC KNEE REPLACEMENTS: THE NEXT FRONTIER

**Registration of the various landmarks in the knee is done using optical trackers and sensors. It gives the robot real-time information on the exact position of the knee during surgery and allows the surgeon to plan the bone cuts accurately.**

Credit: Department of Orthopaedic Surgery

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Conventional knee replacements have served us well for decades. The progress in the various facets of arthroplasty science has also been nothing short of remarkable, ranging from the material science of bearing surfaces to implant kinematics and biomechanics.

However, arthroplasty surgeons have never stopped pushing the limits of technology in search of ways to achieve even better consistency and reproducibility in our surgeries which can hopefully lead to better patient outcomes and implant longevity.

While the success rate of a total knee replacement as measured by revision rates on most nation-wide registries has been excellent, with more than 95% implant survival at 15 years, the patient satisfaction rate after a technically well executed total knee replacement has always been at an estimated 70-80%. Bone cutting inaccuracies can lead to implant malpositioning and imperfect soft tissue balancing, contributing to one of the many reasons leading to inferior clinical outcomes and patient dissatisfaction.

Computer navigation was introduced in the late 90s to improve the accuracy of these bone cuts. These navigation systems utilised a variety of accelerometers and optical trackers to accurately determine the orientation of the bone cuts, and also gave the surgeon real-time feedback and validation of his cuts. This led to greater accuracy of the bone cuts with fewer outliers as compared to knee replacements using conventional techniques.

*However, with computer navigation, the execution of bone cuts is still done manually, and cutting guide toggle has been shown to contribute up to 40% of total cutting error. With robotic joint replacements, technology pushes us one step further in our quest for even better consistency by incorporating robotic arms to assist us with the execution of our planned cuts.*

**The robotic arm assists the surgeon in executing his bone cuts accurately, according to his surgical plan.**

Credit: Department of Orthopaedic Surgery

There are several robotic joint arthroplasty systems in use currently. Although every system incorporates robotics into the surgical workflow differently, they all work towards a common goal of precise robotic execution of a predetermined surgical plan for reproducibly accurate bone cuts.

The indications for a robotic knee replacement are the same as that of a conventional knee replacement. Robotic knee replacements may, in fact, be the preferred choice in certain cases, such as preexisting metal implants around the knee or presence of large extraarticular deformities which make it impossible to use conventional jigs.

The post-operative recovery process of robotic and conventional knee replacement is similar. Most patients can usually start ambulating on the same day after surgery and can be discharged after 2-3 days of inpatient stay. In well selected patients, same day/next day discharge is feasible as well due to the enhanced recovery protocols that we have in place for all elective total joint replacement surgeries at NUH.

The risks and potential complications of a robotic knee replacement are no different from that of a conventional knee replacement. The key difference that patients would notice would be the additional pin site incisions in the leg and thigh regions which are used for application of the robotic trackers. There have been reports of pin site fractures and infections, but these are uncommon occurrences.

*The utility of robotics in knee replacements do come with additional costs. However, the results from existing outcome studies on robotic knee replacements have shown that the increased initial capital outlay may potentially be offset by improved outcome scores, shorter hospital stay and faster overall recovery. Most of the existing data on this burgeoning technology is still considered short term, and we await longer term data on patient outcome and cost-effectiveness as we continue to evaluate the value of this promising new technology.*

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# PSYCHOLOGY IN THE CLINICAL ROOM

## How The 'Attachment Style' Influences Your Patients

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*Dr Tan had just finished his clinics and went through the list of patients he saw today. He wondered to himself, as to why his patients behave so differently. Some were receptive and trusting of his medical advice, while others were anxious with many questions and seemed to worry a lot. There were also patients who seemed indifferent, visited infrequently and did not attend follow-up sessions. He wondered what accounts for these differences in behaviours.*

In 1965, Dr Mary Ainsworth, a Canadian developmental psychologist, studied the behaviours of different babies with their mothers. She observed how the babies behaved in four scenarios: when accompanied by their mothers in a room, when their mothers left the room, and when a stranger entered the room and when the mother returned again. She noted some behavioural differences that she later categorised into a '*secure attachment style*' and an '*insecure attachment style*'.

Babies who displayed the secure attachment style tend to explore the room more when their mothers were around, looked visibly distress when their mothers left and were easily consolable when they returned.

However, those who displayed the insecure attachment styles behaved differently. Some anxious babies cried inconsolably and were difficult to comfort even when their mothers return. Some remained indifferent even when their mothers returned.

Through this study, Dr Ainsworth found that the quality of bonding between mother and child had substantial influence on their behaviours. This experiment, along with her subsequent work with another psychologist, Dr John Bowlby from Tavistock clinic, contributed to the early works on *Attachment Theory*.

The question begs: How do babies crawling in a room impact clinical practice? It was subsequently discovered that attachment styles in childhood, which were influenced by early life experiences, tend to correspond with adult attachment styles. Children who displayed the secure attachment style tend to be securely attached to adults and vice versa for those with insecure attachment. This had been studied in clinical settings and was found to correlate to a patient's behaviour in terms of self-care and health-seeking behaviours as well.

**Those who display insecure attachment style can be categorised into three groups: *anxious-preoccupied, dismissive and fearful-avoidant.*[1,2]**

## ANXIOUS-PREOCCUPIED

Those who are anxious-preoccupied tend to view themselves negatively, are more likely to be highly anxious when away from their families, and are more likely to be dependent on them. They may appear dramatic or clingy in a clinical setting. This may influence the clinician to distance themselves. In turn, this reinforces the patient's need to emphasise further on their problems, co-creating an exhausting vicious cycle for both.

## AVOIDANT-DISMISSIVE

Those who are avoidant-dismissive tend to have a negative view of others and are uncomfortable towards depending on others, including medical professionals. They may appear dismissive, nonchalant, challenging to engage with and risk dropping off contact. They may also delay seeking healthcare services, minimise reporting of symptoms and reveal very little of themselves.

## FEARFUL-AVOIDANT

Those who are fearful-avoidant, usually possess negative views of themselves and others, including medical professionals. Individuals with a history of trauma in childhood are at greater risk of developing this attachment style. They often avoid routine healthcare and only present in a crisis with intense difficult emotions to handle.

These insecure attachment styles have impacts on healthcare utilisation as well. Patients with insecure-anxious attachment tend to over-utilise healthcare services and require more reassurance. Those with insecure-avoidant attachment styles are less likely to utilise healthcare services and may present at a later stage with complications.

Attachment style also influences adherence to self-care advice, medications and outcomes.[3,4] In diabetic patients, those with a dismissive attachment style were associated with lower levels of exercise and adherence to medication. They also presented with higher smoking rates. Patients with a preoccupied attachment style were more likely to display over-reliance on others. However, these patients are likely to have better control of their glycaemic index.

Though attachment styles are influenced by early life experiences, there are increasing studies that show how other positive relationships in the later part of life matters as well. There are also indications that a positive physician-patient relationship may have contributing effects to this.[4]

With the national initiative to provide each resident with their own family doctor, perhaps this could be a golden opportunity for primary care to capitalise on this knowledge. There could be a way to weave this knowledge into daily clinical practice, individualising approach to patients based on their attachment styles to improve compliance, with a goal to reduce excessive healthcare utilisation and optimise treatment goals.

*Alternatively, more research and trials can be done in primary care in this area, through catering more resources for patients with insecure attachments. This may then bring about another perspective in deciphering the psychology of patients and improving compliance.*

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# COLLABORATIVE CARE IN A PRIMARY CARE SETTING

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*Dr Tan had seen Mr Lee, his diabetic patient, for the 6th time. Equipped with knowledge on the latest guidelines, Dr Tan was confident in providing advice on how to optimise control of his diabetes, but Mr Lee just would not listen. He recalls the last session he had spent with Mr Lee, which took half an hour – to no avail. Mr Lee finally returned today, after a six-month hiatus, with a toe that was turning gangrenous. He broke down when Dr Tan informed him that an amputation was required, and lambasted him. Dr Tan could not help but wonder if he could have done some things differently.*

This scenario, though hypothetical, is probably not uncommon among primary care. Noncompliance is often an issue encountered by primary physicians among diabetic patients[1] and it is a common cause for poor outcomes, complications and hospitalisation.[2] While there are multiple factors leading to poor compliance, mental health is also a significant contributor. Studies have shown that diabetic patients with depression tend to have poorer outcomes.[3]

Depressive symptoms in patients with diabetes are also associated with poorer adherence to treatment, decreased function and higher healthcare utilisation. Diabetes and depression often do not denote a positive outcome.

While it makes sense to have a concerted effort to address the twin "Ds", the silver lining is that there are several literature that suggest collaborative care management for diabetes and depression improve outcomes for both glycaemic control as well as depressive symptoms.[4]

However, what is the basis for collaborative care? What is the psychology in collaborative care that makes a difference?

The key 'ingredient' in collaborative care is respect for patient autonomy. Physician approaches towards treatment tend to be paternalistic. In layman's terms, we step into the role of a parent, directly instructing our patients on the steps to take, just as how a parent would to a child. While the information is valid from a professional standpoint, the patient may not always react to it positively.

*A collaborative approach, on the other hand, levels the approach to an adult-to-adult conversation. Information is shared as a way to empower our patients and allow them to come to a decision at their own pace.*

What also goes behind the scenes is the dissonance between cognitive acceptance and emotional acceptance. While one can understand the need for treatment, often, the emotive aspect of it might not have caught up. This is akin to the process of dealing with grief. While an individual may know that he needs to move on at some point, he might feel otherwise.

Similarly, being diagnosed with diabetes, a chronic condition, does evoke a grieving process to a certain extent – grief attributed to the loss of health, medication-free days, a reminder of morbidity and subtle hint of mortality for some.

The collaborative approach allows a shared goal to be made between the case manager, treating physician and patient. This gives the patient the autonomy to pace his/her treatment. You will also find in literature that motivational interviews are also sometimes used by case managers in some collaborative care programmes.

Motivational interviews, similar to collaborative care, recognise the patient's subjective emotional experience through *'rolling with resistance'*. This provides a positive validating experience for the patient to feel understood and cared for. Being understood, and having their feelings attended to, is possibly just as important as providing information on how to manage the condition.

Self-care is also an important component in collaborative care. There is often close follow up by the case manager to provide guidance and information. These calls are often appreciated by patients, as it fills the gap in between clinic appointments.

*From a financial point of view, some literature also illustrates how the collaborative care model reap substantial savings through reducing hospitalisation, emergency room usage and complications.[5] There are also local studies that show how collaborative care improves quality of life in patients.[6] With this, perhaps it is time to introduce collaborate care practises into daily primary care work.*

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# ROLE OF EPSTEIN-BARR VIRUS (EBV) SEROLOGY IN SCREENING FOR NASOPHARYNGEAL CARCINOMA

## A Practical Guide for Primary Care Physicians

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Despite healthier lifestyles and a reduced intake of salted fish, nasopharyngeal cancer (NPC) remains the second most common malignancy among middle-aged males in Singapore.[1] This is true for men of Chinese and Malay descent, while it is uncommon for Indians to be affected by NPC.

Females can also be affected, with a male to female ratio of 3:1. Almost all cases of NPC in endemic countries such as Singapore are positive for latent Epstein-Barr virus (EBV) infection. Unfortunately, two-thirds of patients with NPC currently present with late stage (III or IV) disease.

Red flags that one should look out for include:

- Cervical lymphadenopathy
- Blocked ear or tinnitus
- Blood stains in the mucus or saliva

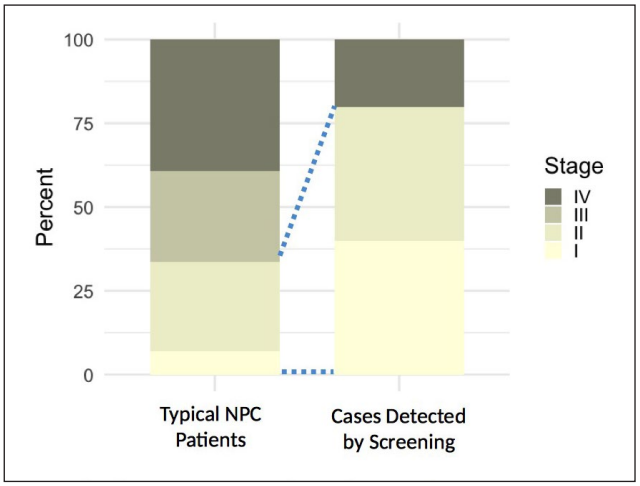



**Fig. 1: Stage distribution of NPC cases detected by screening compared to typical NPC patients presenting in the Otolaryngology clinic.**

## SCREENING FIRST-DEGREE FAMILY MEMBERS

First degree family members of NPC patients have a markedly elevated risk of NPC, particularly during their middle-aged years, at an incidence of 199 per 100,000 person-years.[2] This is more than 20 times that of the general population.

*Cancer screening guidelines in Singapore recommend first-degree family members to be screened for NPC.[3,4] The recommended age to begin screening would be around the age of 40 years, just before the peak incidence of NPC between 40 – 60 years of age.*

Eighty percent of NPC identified through screening was found to be at an early stage (I and II), which confers an excellent five years overall survival rate of more than 90% and 80% respectively.

NPC screening is performed at NUH's Department of Otolaryngology's outpatient clinic using nasoendoscopy for direct visualisation of the nasopharynx. Epstein-Barr virus (EBV) IgA serology is also performed to evaluate risk. The EBV serology test is a useful clinical tool for screening as early tumours may not have an appreciable mass lesion in the nasopharynx during nasoendoscopy. In such scenarios, the elevated serology titer provides a high-index of suspicion and the diagnosis of NPC is clinched by a low-risk outpatient nasopharyngeal biopsy or supported by an MRI scan.

Traditionally, the EBV early antigen (EA) IgA and EBV viral capsid antigen (VCA) IgA immunofluorescence serology tests have been used for NPC screening in Singapore. An EBV EA IgA titer of ≥1:10 or EBV VCA IgA titer of ≥1:160 is considered clinically significant and warrants further evaluation.

Among the EBV serology markers, EBV EA IgA has the best accuracy profile for high-risk family members (sensitivity 85.0 – 100%, specificity 94.6 – 96.4%).[2,5] In particular, it has a positive predictive value of 15.1%, making it useful for identifying individuals at highest risk. This means that more than 1 in 7 family members with an elevated EBV EA IgA ≥1:10 may develop NPC.

While the EBV VCA IgA test has a sensitivity of more than 90%, there has been a gradual move towards

performing only the EBV EA IgA for screening,[3] as a notable proportion of first degree family members have elevated EBV VCA IgA titers ≥1:160, limiting the specificity of the test.

Cell-free EBV DNA from plasma is an emerging modality which has been used for community screening for NPC in Hong Kong.[6] However, NUH's experience, together with that of other institutions,[2,7] has shown that cell-free EBV DNA may not be significantly elevated in small, early stage tumours and hence has a limited role in screening family members who are already undergoing nasoendoscopic evaluation.

## EBV SEROLOGY IN HEALTH SCREENING PACKAGES

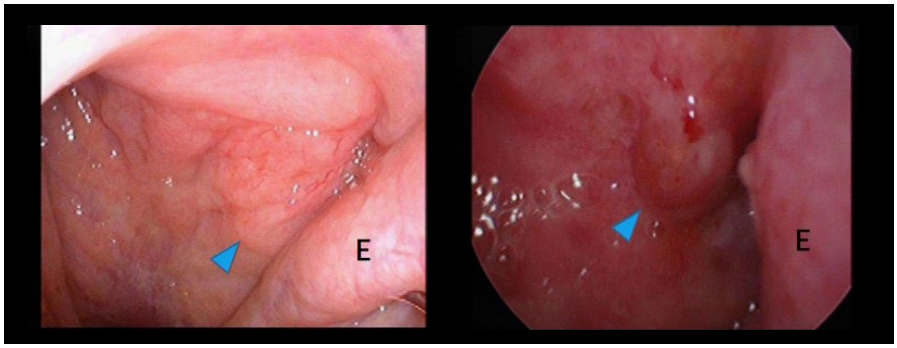
Although the use of tumour markers is not recommended for general population screening, tumour marker panels are commonly included as part of health screening packages, including EBV serology markers for NPC.

Typically, the EBV serology tests performed as part of health screening packages utilise a high throughput enzyme-linked immunosorbent assay (ELISA) method. This is reported as a positive or negative result with a numerical value (converted from colorimetric units), rather than an actual dilutional serology titer from an immunofluorescence assay (e.g. ranging from negative to 1:640).

Patients with a positive EBV ELISA test should be referred to the Otolaryngology clinic for further evaluation with nasoendoscopy. An EBV immunofluorescence serology test is usually repeated to obtain EBV IgA serology titers, in order to better evaluate the patient's risk profile.

*Screening first-degree family members for NPC is highly effective in identifying early stage tumours, which have a significantly better prognosis. An EBV EA IgA immunofluorescence serology is a useful test to evaluate the risk of NPC.*

*Extending NPC screening to the general population is currently limited by a lack of evidence for clinical and cost effectiveness. Along with collaborators in primary healthcare, we hope to close this gap by embarking on a community screening study in the near future.*




**Left: Nasoendoscopic view showing effacement of the left nasopharynx at the fossa of Rosenmuller, just posterior to the eustachian cushion (E). This lesion turned out to be NPC on biopsy.**

**Right: A small T1 NPC tumor of the left nasopharynx, posterior to the eustachian cushion (E).**

Credit: Department of Otolaryngology - Head & Neck Surgery

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# AUDIOGRAM 101

## A Practical Guide for Interpreting Audiograms in Primary Practice

Being hard of hearing is a common symptom brought up by patients or their families, especially in the elderly population. Suspicion of hearing loss is frequently confirmed by an audiometry test, the results of which are plotted graphically on an audiogram.

A basic hearing test is called a *pure-tone audiometry*, and it involves finding a patient's thresholds (softest sound that can be heard) for pure tones that are established over the frequency range of 250 – 8000 Hz.

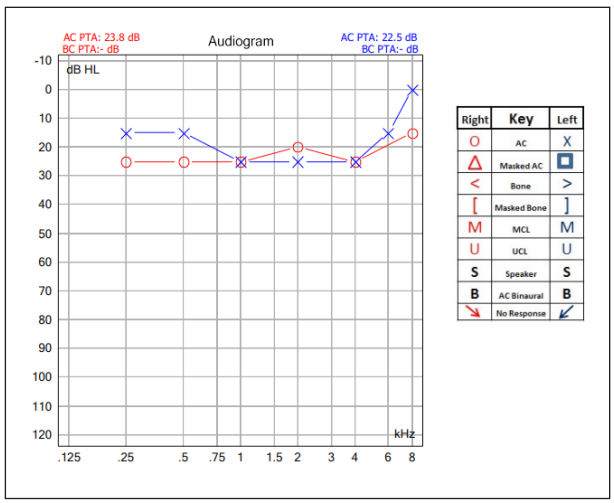
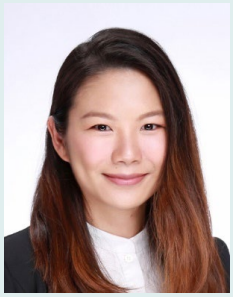



**Fig. 1: Typical audiogram showing normal hearing thresholds, with an attached Key Legend explaining the type of data plotted.**

(PTA: Pure Tone Average. AC: Air Conduction. BC: Bone Conduction. MCL: Most Comfortable Loudness. UCL: Uncomfortable Loudness Level.)

Credit: Department of Otolaryngology – Head and Neck Surgery



**DR EUNICE KWA**

MBBS (WA), MRCS (Edin), MMed (ORL)

Associate Consultant,
Department of Otolaryngology – Head and Neck Surgery,
National University Hospital

**Sub-specialties: Healthy Ageing Programme (Age Better), Otology/Neuro-otology**

An audiogram allows a physician to not only determine how significant a patient's hearing loss is, i.e., if the hearing loss is mild or profound in nature – but also aids in determining if the hearing loss is caused by problems getting the sound into the inner ear (conductive hearing loss), or if it is a problem in the inner ear and beyond in the pathways of the auditory system (sensorineural hearing loss).

It also provides information on the characteristic of the hearing loss, whether it would be better or worse in the higher/lower frequencies. The information allows an audiologist or a physician to make decisions on the treatment strategies that will most benefit a patient's hearing.

The audiogram is performed with circumaural or insert headphones, usually in a sound-proof booth, administered by an audiology technician. After taking a brief history of the patient's otological symptoms, the ears are examined with an otoscope. Any obstructing or impacted debris (such as wax/ foreign body) should be cleared, either with micro-suctioning or gentle flushing.

To understand the data on an audiogram, it will be helpful first to understand the types of hearing loss that can be construed from one.

- **Sensorineural hearing loss** occurs when there is a problem in the inner ear or "neural" issues. This may be a result of genetics, infections, ototoxic medications, or head trauma. This type of hearing loss is usually not reversible.

- **Conductive hearing loss** occurs when there are problems with the movement or "conduction" of sound waves from the external environment into the inner ear. This may be temporary secondary to foreign bodies, impacted wax and middle ear effusions. They may also be persistent issues due to a perforation of the tympanic membrane, congenital defects of the ossicular chain or fixation of parts of the ossicular chain (such as in otosclerosis).

- **Mixed hearing loss** occurs when there are both inner ear and conductive problems. For example, a traumatic tympanic membrane perforation in a setting of long-standing noise-induced hearing loss.

## "DECODING" AN AUDIOGRAM

Simplified: In sensorineural hearing loss, the thresholds for both air conduction (AC) and bone conduction (BC) are affected such that the air-bone gap (difference between the AC and BC thresholds) is close to zero (≤10dB). The presence of an air-bone gap (>10dB) signifies conductive hearing loss.

Apart from the nature of the hearing loss, an audiogram also provides information on the different grades of hearing loss (Fig. 2). This can range from mild, moderate, moderate-severe, severe and profound.

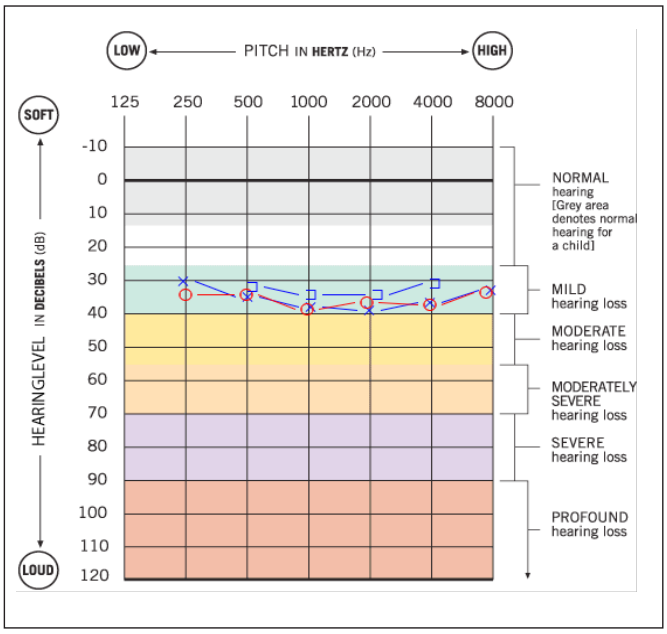



**Fig. 2: Grades of hearing loss**

- Mild: 25 to 40 dB
- Moderate: 41 to 55 dB
- Moderate-severe: 56 to 70 dB
- Severe: 71 to 90 dB
- Profound: greater than 90 dB

Credit: Department of Otolaryngology – Head and Neck Surgery

## INTERPRETING AN AUDIOGRAM

Take a look at Fig. 1 again, which shows a normal hearing threshold in bilateral ears. AC thresholds in the right ear are indicated by a red circle, and blue crosses for the left ear.

Now, consider the following audiogram (Fig. 3) that shows a down-sloping audiogram. The AC and BC thresholds are similar (≤10dB) – hence, this patient has a **sensorineural hearing loss**, and the grade of this loss is mild to severe in the left ear, and moderate to moderately-severe in the right ear. This pattern of hearing loss is typically seen in presbycusis, or age-related hearing loss.

Next, study the following audiogram (Fig. 4a), which shows a significant difference between the AC (red circles) and BC thresholds (red square brackets) in the right ear (>10dB). This means an air-bone gap is present. Since the BC thresholds are within the normal range, this audiogram can be interpreted as a **moderate to moderately-severe conductive hearing loss**. The left ear shows normal thresholds.

In a similar example (Fig. 4b), there is a significant air-bone gap in the right ear, but this time the BC thresholds are within the moderate hearing loss range. Hence, this audiogram can be interpreted as a right sided severe **mixed hearing loss** with a normal left hearing ear.

These hearing loss patterns can happen in any multitudes of configurations in both ears – but a systematic approach to each ear, and with consideration of the history of the otological symptoms, will usually illuminate the interpretation.

Now, with the above understanding of the information detailed in an audiogram, take a look at the following graph (Fig. 5). Even in patients with “mild” hearing loss, there will be a loss of discernment between “f/s/th” sounds, which may impact a patient’s ability to follow conversations and may contribute to speech development issues in the very young.

Referencing Fig. 3, with patients presenting with worse degrees of hearing loss, typical conversations as well as many environmental sounds would become inaudible and undiscernible without amplification, which underscores the importance of early detection and intervention in patients with hearing loss.

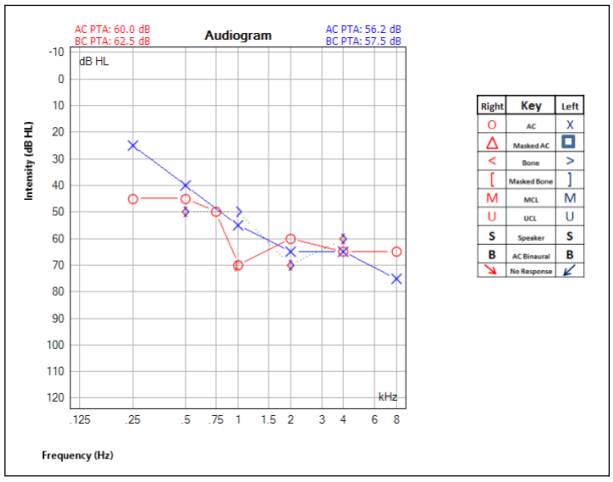



**Fig. 3: Typical audiogram in presbycusis**

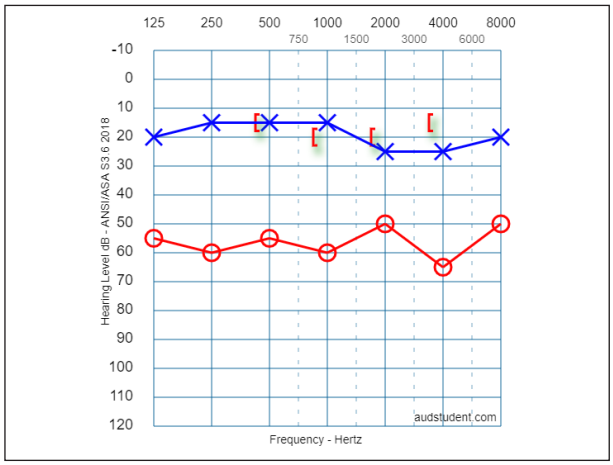



**Fig. 4a: Audiogram of a right moderate to moderately-severe conductive hearing loss, with normal thresholds in the left ear**

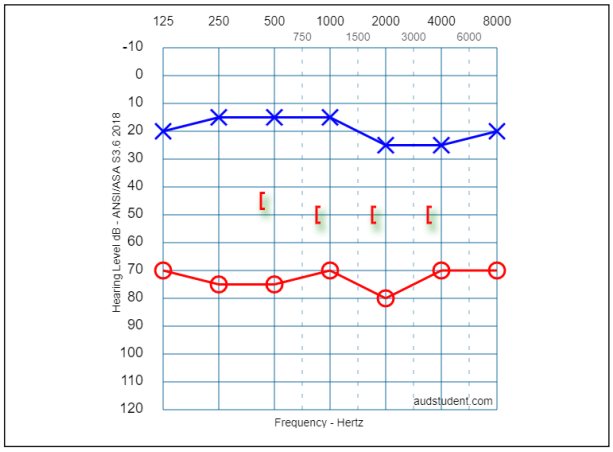



**Fig. 4b: Audiogram of a right severe mixed hearing loss, with normal thresholds in the left ear**

Credit: Department of Otolaryngology – Head and Neck Surgery

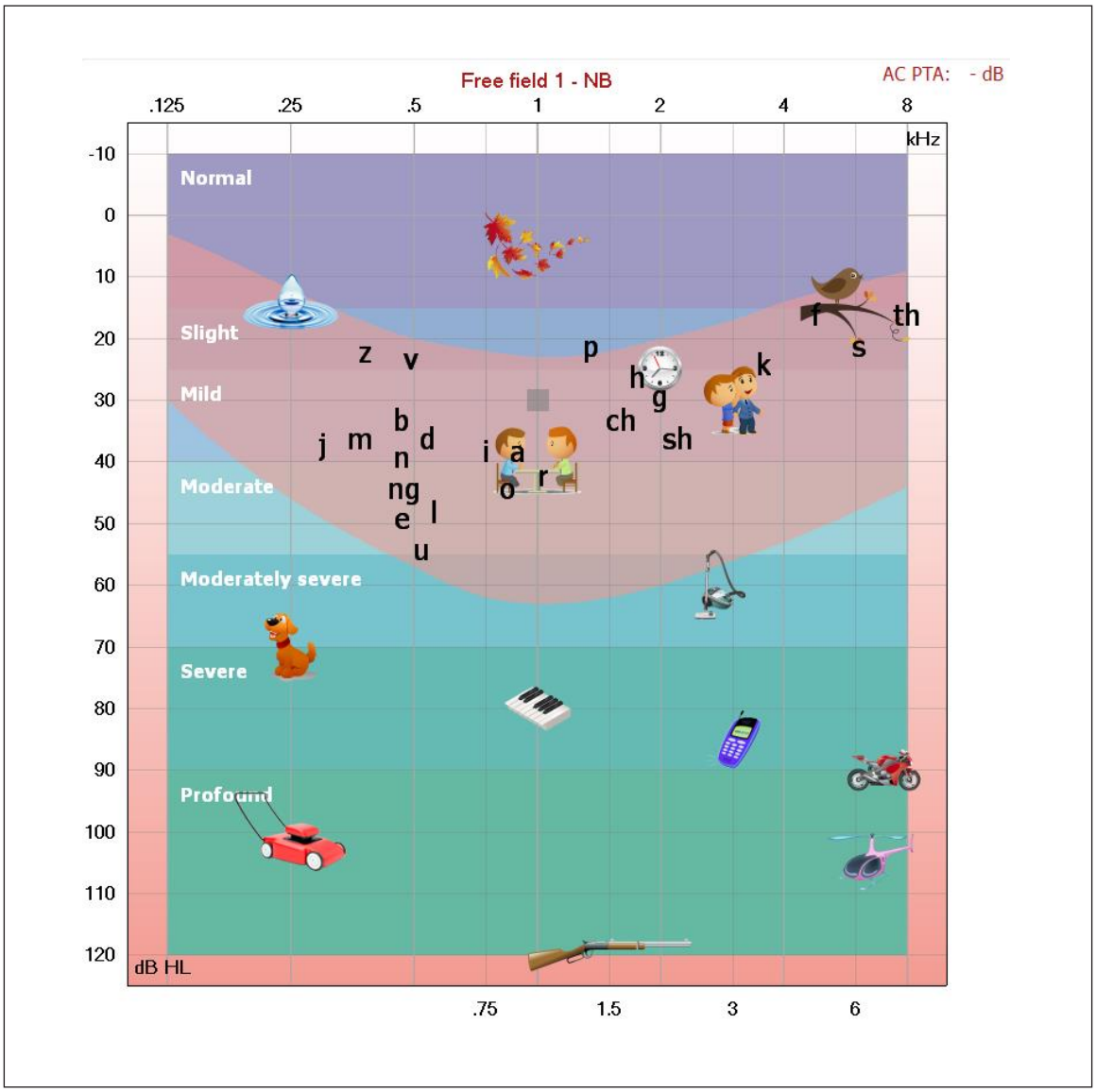



**Fig. 5: Pictorial representations of speech sounds in a "speech banana" and other common sounds plotted according to their loudness and frequencies. The severity of hearing loss is also indicated on the right axis of the graph.**

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# DR DAVE LEE

*Dr Dave Lee is the Head and Senior Consultant of Division of Sports, Shoulder & Elbow Surgery from the Department of Orthopaedic Surgery at the National University Hospital.*

*He specialises in arthroscopic repair of knee and shoulder with a special interest in knee preservation. Over the last 12 years, he has performed more than 3,000 arthroscopic surgeries of the knee, shoulder, ankle and hip. This includes over 1,500 knee ligament reconstructions and over 400 knee preservation procedures such as osteotomies, meniscus transplants, cartilage repair and reconstructions.*

*Dr Lee represents Singapore on the committees and boards of International Society Arthoscopy Knee Surgery and Orthopedic Sports Medicine (ISAKOS), Asia Pacific Knee Arthroscopy Sports Society (APKASS), Asean Society Sports Arthroscopy (ASSA) and Asia Pacific Orthopedic Association (APOA) Sports Section.*

## What is a typical day like for you?

My typical work day at the hospital starts at 7am. Starting early allows me to review results and scans that have been ordered. I also take this opportunity to answer emails and plan for the day ahead. There are morning department meetings thrice a week that starts at 7.15am. After these meetings, it would either be full-day clinics to see patients or performing surgeries in the operating theatre, which I do twice a week.

My workday usually ends in the evening with a short run in the gym or outdoors, before I head home for dinner. On some days, I have evening meetings at work or with organisations that I belong to.

## What do you enjoy most about your work?

It is the opportunity to continually learn, teach and innovate.

The complex cases that are referred to me at NUH allow me to master knee preservation and sports injuries. I also enjoy opportunities to better understand my patients' injuries and to decide who needs surgery and who does not. They say that an accomplished surgeon knows when best not to recommend surgery. We can only hone this skill with experience and practice.

For those who require surgery, I aim for the best treatment to help them return to their previous physical health with the least surgical intervention. I enjoy that there are many senior surgeons in the orthopedic department whom I can learn from every day. As one of them often reminds me – our learning in knee surgery continues.

The clinical problems and technical issues that I see serve as the stimulus to look for innovative solutions to treat my patients. This drives my research and publication interests.

## Could you share your most rewarding professional moments?

The greatest reward is seeing my patients return to their previous function as early as they can. This means that they can restart the sports they enjoy or return to a job they have been doing. Receiving invitations to teach sports surgery to fellow surgeons overseas is another significant aspect that is rewarding.



Top left: Dr Dave Lee teaching shoulder arthroscopy to Asean surgeons in cadaver lab in Ho Chi Minh, Vietnam
Top right: Dr Dave Lee (Middle row second from left) with his Masters Waterpolo team-mates at Singapore Pesta Susan Games 2019
Bottom left: Dr Dave Lee giving a talk at an International Sports meeting (ISAKOS Shanghai 2017)
Bottom right: Dr Dave Lee (top row centre) hosting the Asian Knee group meeting in Singapore 2019

## What do you do to prevent burnouts, and to maintain good mental and physical well-being?

The best way to prevent burnout is to choose work that continually interests you, so that the work done daily does not become a chore. Do not solely chase financial rewards in your job. it is necessary to look for other rewards. For example, satisfaction from patients you treat and recognition from your peers. Finally, I advocate taking short breaks at least twice a year away from work that allow you to reflect and consolidate. It is often from these breaks that I get new ideas.

## What are the three most important things to you in your career?

Family, friendship and professionalism.

## What are your personal and career goals and dreams that you hope to achieve?

My personal goal is to continue to perform surgeries for as long as I can. I want to continually learn and remain relevant in my field of expertise. I always think about how a procedure or a patient assessment can be done better. For career goals, I would like to set up a full-fledged multi-disciplinary Sports Centre in NUH that performs world class surgery, cutting edge treatments and high-impact research. I hope to continue to be able to share my experience with junior surgeons locally and regionally to shorten their learning curve, to best treat their patients.

## Do you have any tips to share with our primary care physician partners in managing patients who have common knee problems?

Younger patients are more likely to require surgery after an acute injury. Older patients above 50 years old can have a trial of physiotherapy and should not be rushed into surgery.

One of the most common knee injuries I see in patients over 50 years old are meniscus root tears. I see a patient with this condition about once a week. These patients experience a sudden onset of posterior knee pain, knee swelling and stiffness. This often starts after they hear a ‘pop’ while descending the stairs. Such injuries need to be assessed and followed up, as they herald the onset of early osteoarthritis in the knee.

# PAEDIATRIC PODIATRY SERVICE AT KHOO TECK PUAT – NATIONAL UNIVERSITY CHILDREN'S MEDICAL INSTITUTE (KTP-NUCMI)

A paediatric podiatry service is now available for patients 17 years old and below at Khoo Teck Puat – National University Children's Medical Institute (KTP-NUCMI) at NUH. The service, which started in June 2022, will focus on musculoskeletal pain and other developmental pathologies of the feet and lower limbs, except asymptomatic flat foot. Skin and nail conditions can also be referred.

Equipped with the expertise in the field of foot biomechanics in the young foot, the podiatrists are able to address foot problems and any underlying conditions through the use of footwear, customised insoles (orthoses), strengthening exercises and other modalities.

The service will provide assessment and diagnosis, followed by treatment to, where possible, reduce pain and improve foot function, enabling the child to continue with their daily activities. Medical and developmental history will be recorded at the first clinic visit, together with clinical evaluation of foot function and presenting signs and symptoms. A treatment plan will then be designed in consultation with the patient and caregivers, taking into consideration specific circumstances and preferences.

Credit: Khoo Teck Puat – National University Children's Medical Institute

Appropriate referral to the service will require an understanding of what it can and will treat. Below are details of the paediatric podiatry scope of evidence-based practice to ensure the appropriate channeling of referrals and prevent duplication, waste and over-referral.

### Paediatric podiatry assessments:

1) Clinical examination
2) Gait analysis
3) Footwear assessment

### Appropriate conditions to be referred:

- Painful or symptomatic musculoskeletal foot and ankle conditions
- Symptomatic flexible flat feet (pain, fatigue, functional concerns such as excessive trips/falls, instability, gross motor skill delay, gross pronation)
- Foot deformity such as club foot
- In-toeing
- Metatarsus adductus
- Juvenile hallux valgus
- Digital deformity
- Osteochondritis
- Ingrown toenails
- Hard skin lesions

### Inappropriate referrals include:

- Asymptomatic non-pathological flexible flat foot
- Viral warts
- Leg length discrepancy less than, or equal to 1cm
- Leg length discrepancy more than, or equal to 1cm
- Ankle-Foot orthoses and footwear modification
- Bunion night splints, digital splints and toe separators

### Podiatry treatment options:

- Stretching and strengthening exercise programmes
- Footwear advice
- Strapping techniques
- Foot orthoses (pre-made or customised)
- Digital devices (silicone digital props/caps)
- Protective and pressure deflective padding and wedging
- Foot care advice
- Skin and nail care
- Nail surgery

**Rehabilitation Centre @ Khoo Teck Puat – National University Children's Medical Institute (KTP-NUCMI)**

**Location:**
NUH KTP-NUCMI, Zone E, Level 8

**Opening Hours:**
Every Tuesday: 9:00am – 12:00pm

**Contact for GP Referral:**
Tel: +65 6772 2000
Fax: +65 6777 8065
Email: gp@nuhs.edu.sg

(Kindly note that referrals will first be directed to Paediatric Orthopaedics for internal referral to the Paediatric Podiatry service.)


Click here for detailed directions on how to get to KTP-NUCMI.

## Primary Care Engagement (PCE)

At National University Hospital (NUH), we recognise the pivotal role general practitioners (GPs) and family physicians play in general healthcare provided within the community. As such, we believe that through closer partnerships, we can deliver more personalised, comprehensive, and efficient medical care for our mutual patients.

Primary Care Engagement Department aims to facilitate collaboration among GPs, family physicians and our specialists. As a central coordinating point, we support patient referrals and organise continuing medical education (CME) events. Through building these important platforms of shared care and communication, we hope that our patients will be the greatest beneficiaries.

## Continuing Medical Education (CME) Events

At NUH, we strive to advance health by integrating excellent clinical care, education and research. As part of our mission, we are committed to providing regular CME events for GPs and family physicians. These events aim to provide the latest and relevant practical clinical updates towards patient care.

Organised jointly by Primary Care Engagement Department and the various clinical departments within NUH, our specialists will present different topics in their own areas of specialties during these symposiums.

**We would love to hear your feedback on MEDICO. Please contact us at:**

**Primary Care Engagement Department**

**Email: pcce@nuhs.edu.sg**

**For GP referral appointments, please contact us at:**

**Tel: +65 6772 2000**

**Fax: +65 6777 8065**

**Email: gp@nuhs.edu.sg**

**For more information on our CME events, please visit:**
**www.nuh.com.sg**

**A Publication of NUH Primary Care Engagement Department**
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