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**Ronald Raven Travelling Fellowship -
February 2017
A Report**



Jorvi Hospital, Helsinki

Aims of this observership

During my training in the Wessex deanery, I am very grateful to have received training in a wide variety of whole breast reconstruction techniques, as well as experience in volume replacement following breast conserving surgery. I have also strived to widen my knowledge of techniques not available regionally, by attending regional and national conferences showcasing novel breast and plastic surgical techniques.

With improvements in breast cancer treatment, women are now living significantly

longer with the results of their surgery, and quality of life and satisfaction are now accepted as very important targets for successful treatment. The NICE clinical guideline CG80 mandates not only that breast reconstruction should be discussed with all women being advised to have a mastectomy (where not precluded by comorbidity or adjuvant treatment) but also that all reconstructive options should be offered and discussed, irrespective of whether they are available locally.

Dr. Susanna Kauhanen MD PhD is a senior plastic surgeon working at Jorvi Hospital, part of Helsinki University Hospital, Helsinki, Finland. She has worked extensively on the technique of de novo total autologous breast reconstruction using water-assisted autologous fat grafting alone, and herself directs a masterclass to train this technique. During this observership, I hoped to attend outpatient clinics, pre-operative counseling, observe the technique of this form of autologous reconstruction at various stages of completion, and interact with the patients post-operatively. I also hoped to gain familiarity with other novel applications of fat transfer, important aspects in the pre-operative counselling, and insights into the technical aspects of fat transfer that have resulted in such good outcomes in Dr. Kauhanen's practice.

I feel strongly that gaining further experience of this technique will augment my strong foundation of breast training, whether or not I utilise it in my routine practice in the future. The experience will better inform my future discussions with women as to their full spectrum of their delayed reconstructive options. Furthermore, it will undoubtedly allow me to better serve patients who have experienced cosmetic failure following breast-conserving surgery and in whom lesser volumes of fat grafting could significantly improve satisfaction and quality of life.

As a Finnish speaker, I would have the advantage of being involved in the pre- and post-operative counseling of these patients, which I believed would be invaluable in understanding their motivations in undertaking this form of reconstruction as well as satisfaction with outcome. Having recently

undertaken a wide audit of patient-reported outcomes following oncoplastic breast-conserving surgery, I would also be in a good position to make comparisons of long-term satisfaction with the post-operative results.

I felt that these aims fitted well with the aims of the Association, and in particular the President's recent message related to the 'art' of cancer surgery, highlighting the importance of satisfaction to survivorship, and the encouragement to make the late effects of treatment tolerable.

Introduction

With a population of about 5,500,000 and one of the lowest population densities in Europe, Finland has a mature publicly-funded healthcare system and historically little financial pressure on healthcare resources. Healthcare is provided by local municipalities, with primary healthcare services provided by local health centres (most of which also house in-patient beds), and secondary care provided by district and regional hospitals.

Helsinki, Finland

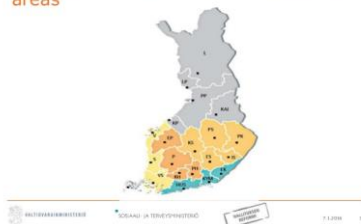


For regional specialised care, Finland is divided into 20 hospital districts served by five university hospitals. By population, the hospital district of Helsinki and Uusimaa is the largest, covering a population of almost 1,000,000 (Helsinki 630,000, Espoo & Uusimaa 270,000). This district includes 24 hospitals, within which Helsinki University Hospital (HUS) is the largest. As well as being the regional hospital for its 24 district municipalities, as the largest university hospital in Finland, HUS is nationally responsible for tertiary trauma and rare

disease care, employing 49 individual medical specialties (1).

Hospital districts and associated University Hospitals (1)

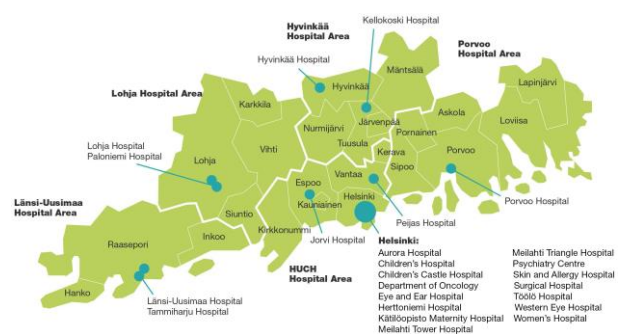
Hospital districts and special catchment areas



Patients referred for breast

reconstruction have undergone their primary treatment at HUS Central Hospital (HUCH) Breast Surgery Unit, which is the largest breast surgery unit in the Nordic countries, treating over 1,000 new breast cancer cases per year (1), almost a quarter of nationally registered new breast cancers (2). HUS's plastic surgery service is split between Jorvi Hospital (mainly elective plastic surgery) and Töölö Hospital (mainly plastic surgery trauma). As well as immediate and delayed whole breast reconstruction, they offer a wide range of breast plastic surgery, including flap reconstruction for locally advanced/recurrent cancers, breast reduction and symmetrisation, and surgery to correct developmental breast disorders (1).

Hospital sites forming the Helsinki and Uusimaa district (1)



Jorvi Hospital



At Jorvi Hospital in particular, there has been a steady increase in the total number of whole breast reconstructions, with proportions of latissimus dorsi (LD) and microvascular flap reconstructions remaining quite stable, but reconstructions using free fat grafting being performed more commonly at the expense of implant-based techniques. This is true both for all reconstructions and for delayed reconstruction.

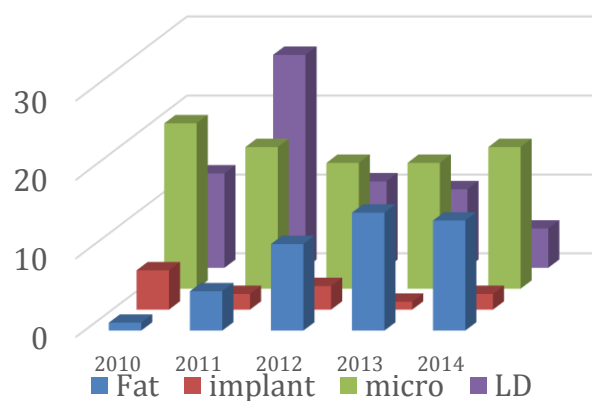
Historically in Finland, there has been a strong favouring of autologous reconstruction, which makes up approximately 80% of all total breast reconstructive procedures (2).

Reconstruction is discussed with all women undergoing mastectomy, with the uptake in recent years being approximately 50% (3). In 2013, of the 4,800 new breast cancers recorded by the Finnish National Healthcare Registry, 2273 mastectomies were carried out, and 715 whole breast reconstructions were performed (Implant-based 74, Implant-assisted flap-based 171, autologous 470). (2)

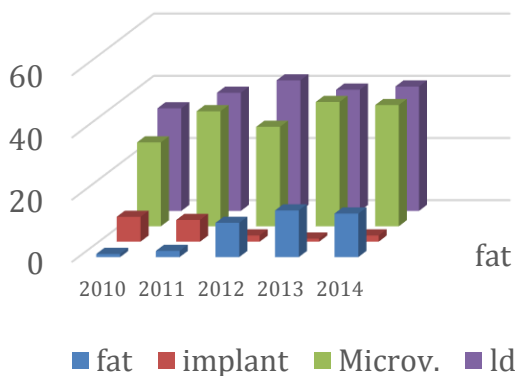
Jorvi Hospital: Main corridor and Surgical Unit

Trends in reconstruction at Jorvi Hospital 2010-2014 (3)

Delayed Reconstruction



All Reconstructions



In fact, fat-grafting for all indications has risen exponentially, with the first 7 cases performed in 2007, and over 160 cases performed in 2015 (3).

I was fortunate to be a member of the faculty at the 7th Winchester oncoplastic masterclass together with Dr. Susanna Kauhanen who has worked extensively on the technique of de novo total autologous breast reconstruction using water-assisted autologous fat grafting alone.

Its advantages include replacing breast tissue 'like for like' with a natural substitute, whilst not involving the long-term donor sites morbidity involved in pedicled or free-flap reconstruction. This is an evolving field with little available long-term follow-up data, however Dr. Kauhanen and colleagues have shown the technique to be reproducible and low-risk in an extensive multicenter European study, using water-assisted fat grafting to yield very high patient satisfaction and good aesthetic results even in patients who have undergone post-mastectomy radiotherapy and therefore traditionally would not be appropriate for all types of delayed reconstruction (4,5).

Fat grafting

Autologous fat grafting (AFG), also known as fat grafting, fat-filling or lipofilling, is an increasingly popular technique used in breast reconstructive surgery. AFG was first used over a century ago for filling contour defects, however the modern technique in the breast follows the description by Bircoll (6,7) of a method to harvest fat by liposuction and

simultaneously transplant it into the breast. He described its major advantages as the availability of abundant donor tissue that is soft, malleable, autologous and easily harvested. Subsequently over the last two decades, AFG has been used for cosmetic breast augmentation, correction of asymmetry and/or deformity (congenital or following breast cancer treatment), and as an adjunct or primary tool in breast reconstruction.

It is more than the filler function of fat which has made fat grafting attractive; many studies have reported the regenerative effects of autologous fat grafts related to the presence of mesenchymal adipocyte stem and progenitor cells (ASC) contained within the harvested fat (lipoaspirate). The population of these cells is thought to be related to the harvesting technique and cell-isolation procedure used. Using fluorescence microscopy and cytochemical staining, Meyer *et al* concluded that the lipoaspirate obtained by water-assisted liposuction (WAL) contains a high number of stem cells which displayed typical mesenchymal differentiation potential (8). ASC may ultimately represent a valuable therapeutic option in tissue repair, with their therapeutic potential related to their properties of proangiogenesis, secretion of antiapoptotic factor, immunomodulatory effects, and capacity for multilineage differentiation and ready expansion (9,10). These effects are particularly observed in improved skin quality following irradiation (11,12), leading to a notion that free fat transfer is in itself 'stem cell therapy' (13). Therefore the indications for AFG over and above its use as a filler material include any situation where tissue damage has occurred, most notably post-irradiation and chronic inflammation (14–16).

The safety of fat grafting

Early attempts at AFG were often accompanied by relatively low rate of graft yield, with correspondingly high rates of resorption and fat necrosis. These can be associated with the development of microcalcification, leading to concerns regarding interference with breast cancer mammographic surveillance. Mainly on this basis, the American Society of Plastic and Reconstructive Surgeons (ASPRS) declared

their lack of support for it in 1987 (17). They overturned this in 2009 following the enstatement of a working group who concluded that no robust evidence existed to suggest that fat grafting interferes with breast cancer detection. They do however continue to advise caution in the interpretation of surveillance imaging.

The question of de novo cancer induction or accelerating growth of a pre-existing cancer by fat grafting has not been answered to date (18). Thus far, no guarantee of cancer safety in fat grafting can be given to patients, although again there is no good evidence of increased breast cancer occurrence or recurrence after fat grafting at this time. Charvet *et al* (19) conducted a systematic review examining the oncological safety of AFG in 9 basic science and 16 clinical studies. This concluded that while basic science studies do show that ASCs can encourage the proliferation, migration and metastasis of breast cancer cells both in vitro and in vivo, this has not been translated consistently into an increased risk of recurrence in clinical studies, likely to be because the concentration of ASCs in these studies is considerably greater than that in fat-grafting. In a recent large series, Silva-Vergara *et al* (20) reviewed 195 cases for a median of 74 months, citing a local recurrence rate of 3.1%, equating to 1.08% per year, comparable to accepted levels of local recurrence in patients without lipofilling.

So at this point, while the best studies suggest that there is no increased risk of breast cancer, the most experienced authors admit that there is not enough good quality data to make a definitive claim for the oncological safety of fat grafting. The onus therefore lies with responsible surgeons to ensure adequate cautious oncological follow-up of lipo-filled patients.

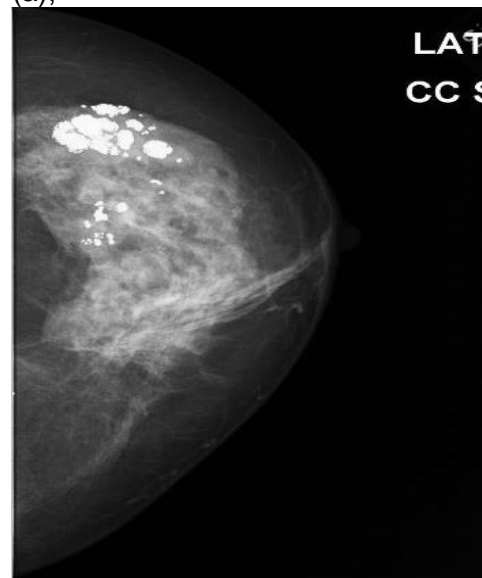
Imaging

Pre-operatively, a radiological work-up in the form of mammogram and ultrasound or MRI is recommended prior to any fat grafting to the breast, to exclude new or recurrent malignancy.

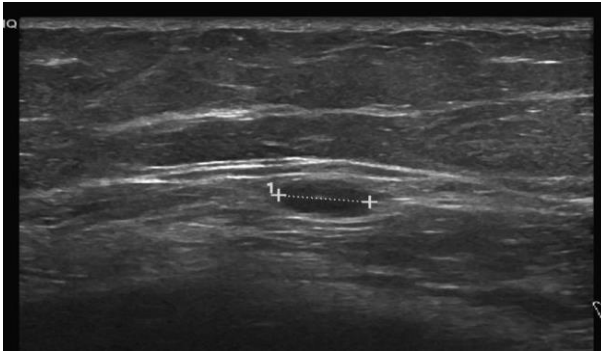
Post-operatively, the ASPRS Fat Graft Task Force has now concluded that on the current available data “there appears to be no interference with breast cancer detection” (21). It is important however, to inform the reporting radiologist of previous fat-grafting, because there are appreciable changes visible after AFG. On mammography, microcalcification is the most obvious, whereas oil cysts are discerned especially well on ultrasound, representing pools of grafted adipocytes that have not revascularized. If there is any doubt as to the nature of an imaging abnormality following AFG, MRI is recommended, having the highest sensitivity and specificity (22).

Fat necrosis, oil cysts and calcification following AFG seen on (a) mammography, (b) ultrasound and (c) MRI (3)

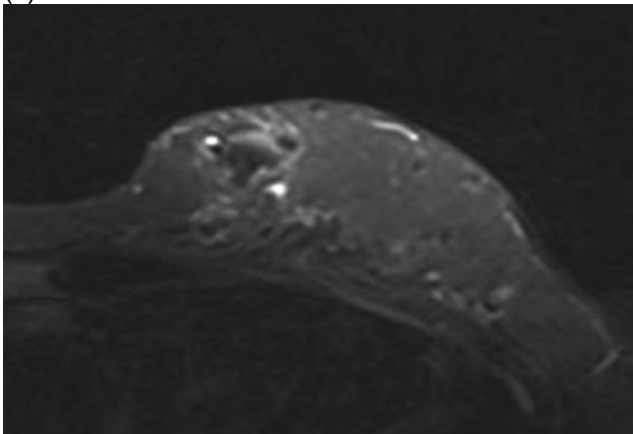
(a),



(b)



(c)



Autologous Fat Grafting at Jorvi Hospital

Dr. Kauhanen describes a wealth of potential applications for free fat grafting, both in the breast and elsewhere. Indications in breast reconstruction include: flap revision (e.g. following DIEP reconstruction with localized flap necrosis); optimising mastectomy flaps in preparation for delayed reconstruction (in particular optimising post-radiotherapy mastectomy flaps to allow implant-based reconstruction); treating capsular contracture following implant-based reconstructions; additional volume for autologous LD reconstruction to avoid an implant or contralateral reduction mammoplasty; and total autologous breast reconstruction.

She also uses fat to improve donor site morbidity following autologous breast reconstruction, such as chronic latissimus dorsi donor site bursae, painful scars and asymmetry. For cases of congenital asymmetry, Dr. Kauhanen has used this technique to deal with asymmetry related to hypoplasia, mild/moderate cases of tuberous deformity, and Poland's syndrome.

The future: Cell-assisted lipotransfer?

Cell-assisted lipotransfer (CAL) utilises fat grafts that have been enriched with a patient's adipose-derived stem cells to enhance both angiogenesis and adipogenesis. The process involves removing part of the harvested fat to be cleaned, centrifuged and digested to isolate stem cells (the stromal fraction). This fraction is then added back to the remainder lipoaspirate for injection into the donor site.

In the clinical setting, it is hoped that better long-term graft retention and lower post-operative complication rates will result (23,24). While there is relatively little work very short follow-up (25) using this technique in breast reconstruction, the majority of studies are positive in relation to graft retention, complication rates, patient- and surgeon-reported outcomes (25). However, the procedure is significantly slower and more costly than conventional fat transfer (26), and concerns have been raised in a few laboratory-based studies that stem-cell enrichment may increase the rate of local recurrence or metastasis (27,28).

In contrast to the wide international practice of lipofilling to correct volume after breast conservation, Dr. Kauhanen feels that fat filling alone tends not to produce the optimal result. Prior radiotherapy often leads to poor fat retention, and poor skin quality is not adequately addressed. Instead, she prefers to use a combination of fat-grafting and a local chest-wall perforator flap, together with scar release (rigotomy).

Outside the breast, she has used fat grafting to treat such varied indications as meningomyelocele, resistant seroma following melanoma block dissection, amputation stump contouring, anal stenosis following haemorrhoidectomy, recurrent anal fistulae, pressure sores and neuropathic pain (including post-mastectomy pain, an application for which there is growing evidence) (29–32).

Total Autologous Breast Reconstruction using AFG at Jorvi

Fat grafting as a form of breast reconstruction was originally popularised by Roger Khouri, in combination with the BRAVA system (33). Since then, Dr. Kauhanen and colleagues have published two series demonstrating their excellent outcomes (4,5). Their main considerations with regards to patient selection include: adequacy of fat at the donor site, availability of redundant skin for recruitment, acceptability of multiple procedures, and reluctance to consider new scars, more major surgery and implants.

Auditing of their local practice has shown that in unirradiated patients, the complete reconstruction process has required a median of 3.6 grafting sessions, with 209ml fat injected per session (range 107-300ml), and a trend towards lower-volume transfers over time with improved take-rates as part of the learning curve. Progress is slower in chest walls which have been irradiated however, with a median of 4.6 fillings required, and a mean fill-volume per session of 189ml (range 130-260ml). Mean operating time per session is 62 minutes (range 35-137 minutes), and in their series of 56 patients, only 7 (12%) have not completed the reconstruction process. Of these, 3 patients elected to have a temporising expander inserted and then continued with lipofilling, 2 patients chose to go direct to implant-only reconstructions, and 2 patients abandoned the reconstruction process altogether (3).

They have found that the take-rate demonstrates significant individual variation (40-80% per session). However, their series has demonstrated high satisfaction (mean 9.2/10, range 7-10) scored on aesthetic and functional outcomes, comfort and self-esteem. They have also shown high objective aesthetic scores as judged by a panel of plastic surgeons from another unit (mean 8.2/10, range 5-10) (3).

About half of their patients have undergone additional procedures to complete their reconstructive process (e.g. nipple-areolar reconstruction), and a third have undergone or planned to undergo contralateral reduction mammoplasty (3).

Where there is an excess of skin in the axillary fold (the so-called 'dog-ear'), the team recycle this as a lateral fasciocutaneous flap, thereby maximizing volume, recruiting skin and simultaneously tidying the lateral chest wall contour.

The unit also shared with me their cost-efficiency analysis for this technique compared with other forms of delayed breast reconstruction. This showed that while lipofilling alone requires a mean of 3.5 procedures per patient, length of stay and time off work is comparable to implant-based reconstruction, and total theatre time required and material costs are not unfavourable.

Cost comparison of free fat graft autologous reconstruction to other forms of delayed reconstruction (3).

Operative Method	Theatre time	Hospital stay Time off work	Mean no. procedures	Material Costs (Euro)
DIEP	6 h (+?)	5-6 days 5-6 weeks	1 (+0-3)	300
Autologous LD (+ implant)	4 h (+?)	3-4 days 4-5 weeks	1 (+0-3)	700
Expander + implant	1h + 1h (+?)	0-1 days 2 weeks	2 (+0-3) + clinic x 2-5	1200
Expander, Implant + ADM	1 + 1,5h (+?)	0-1 days 2 weeks	2 (+0-3) + clinic x 2-5	3000+
Lipofilling alone	1h x 3-5	0-1days 3-14 days	3.5	3.5 x240*= 840

Operative Technique



Harvest

In terms of the harvesting of the fat graft, my experience to date had always been that the tumescence fluid is made up of crystalloid with added adrenaline and local anaesthetic. However, Dr. Kauhanen was able to introduce me to robust evidence suggesting that local anaesthetic agents demonstrate a dose-dependent toxic effect on adipocytes and ASCs (34,35). She therefore does not use any local anaesthetic within the infiltration, which is made up of 1L 0.9% NaCl containing 1mg adrenaline.

The main technical tip for harvest that I learned in Jorvi was to ensure generous infiltration of the tumescence fluid and then maintain smooth gentle passes of the aspirator using a pronation-supination motion to make best use of the off-set design of the liposuction cannula, and to observe carefully for a shift in the aspirate from a healthy peach colour to a more blood-stained appearance. The depth of aspiration is also very important, ensuring that fat is being harvested from the subcutaneous rather than sub-dermal layer to ensure the best yield without leaving a rippled, scarred result.

Dr Kauhanen invariably uses each donor site only once, harvesting from a single donor site at each theatre visit, as she feels that the yield is insufficient when a donor site is used again. She always uses a water-assisted approach, and harvests at the lowest effective pressures as these factors are supported by evidence suggesting enhanced viability of the graft (36,37).

Bodyjet® (HumanMed AG) Water-Assisted Liposuction System



The aspirate is then decanted to separate the fat from other fractions. She does not centrifuge or strain the aspirate, unless she requires nanofat particles for injection into the face through a smaller-gauge needle.

When harvesting is complete, Dr. Kauhanen always ensures meticulous care of the donor site, as I now appreciate that this causes the most post-operative morbidity. She taught me to carefully ensure that all tumescence fluid was massaged out before injecting a long-acting local anaesthetic (she uses Ropivacaine 7.5mg/ml, max 300ml) via the aspiration incisions. This provides 24 hours of analgesia.

Graft injection

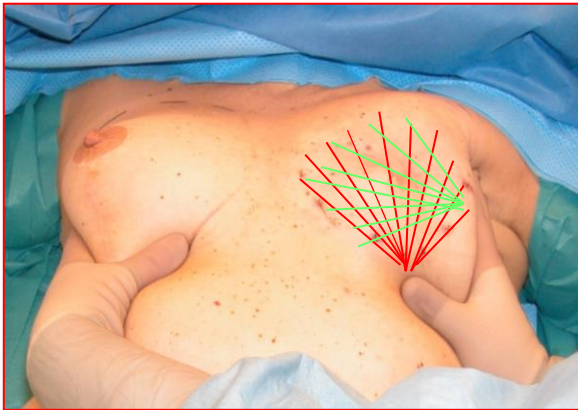
In terms of application of the graft to the recipient tissue, Dr Kauhanen feels strongly that technique is paramount in



affecting the long-term outcome. A gentle technique is known to enhance graft viability and retention (38), and she therefore made sure that I was performing this correctly. In

particular, she ensured that I was avoiding injecting intraparenchymally into breast tissue, was injecting small volumes (0.5-1ml) on drawing back the needle at each pass, and was creating multiple thin rows in different trajectories and different layers to maximize graft take, but that I strictly did not inject beyond the breast 'footprint'. The layers that we utilized were subcutaneous, subdermal and where applicable, intramuscular.

Fan-like pattern of graft injection (3)



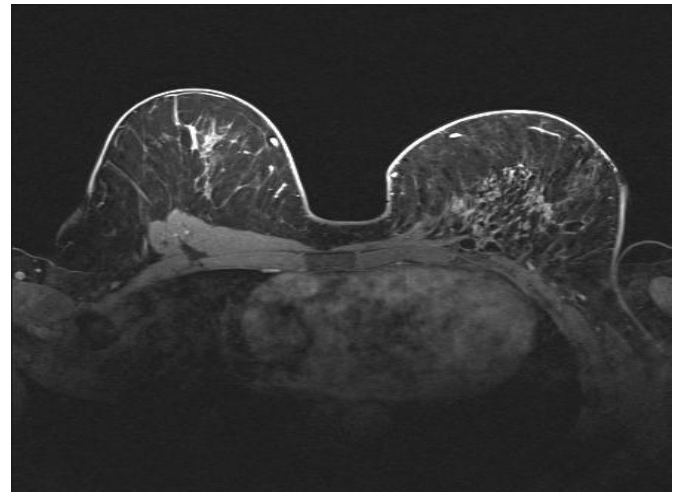
She taught me the technique of injecting superficially in the subdermal plane in the lower pole of the breast order to stretch the skin and thereby improve ptosis and a natural appearance, and demonstrated the indications of the various injection cannulae.

I was introduced to the Cytori Celbrush®, a stainless steel surgical instrument which is designed to allow the delivery of micro-droplets during grafting, preventing over-filling by only allowing 0.5ml of fat to be injected during each pass, controlled by a thumb-wheel. Taking advantage of this control, one can use 10ml syringes (rather than 2ml), which greatly increases theatre efficiency, reduces waste, and reduces scrub nurse decanting time.

I was able to appreciate when to stop grafting, getting a good idea of the signs of overgrafting in terms of skin colour and tissue tightness, and was given the *Goldilock's analogy* of '...Not too hard, not too soft, but just right!'. Overfilling leads to oil cysts and fat necrosis, both of which have the joint disadvantages of unpleasant lumpiness, patient anxiety and requirement for

investigation to exclude breast cancer recurrence.

MRI 1-year post completion of left autologous breast reconstruction using AFG (3)



Post-operatively, great care is taken to keep the recipient site warm and free of pressure, using padded dressings and warming blankets. Dr. Kauhanen likens this meticulous attention to the recipient site to 'treating your graft like a nest of eggs', highlighting the importance of care at every step of the technique.



The vast majority of cases are done as day-case procedures, with a small minority requiring an overnight stay. All patients are provided with pressure garments to be worn over the donor site 24 hours per day for a minimum of 2 weeks. Patients are counselled pre-operatively regarding sick-leave, return to work, the likelihood of needing serial procedures, and are told to expect donor site bruising.

Clinical experience

During this observership, I was fortunate to enjoy the full breadth of clinical experience, including outpatient clinics, in-patient ward rounds, main theatre and day-surgery operating lists.

In the outpatient clinic, I encountered patients along varying stages of the AFG breast reconstruction pathway. This included the initial assessment and counselling of a new patient referred for delayed reconstruction, and a patient attending for pre-operative assessment and consent prior to the first AFG session. Although not essential, my ability to speak Finnish was a tremendous advantage in this setting, as it allowed me to hear first-hand the concerns and questions posed by these women, as well as gain greatly from understanding the tone and language used by Dr Kauhanen when explaining the procedure in its context of the options for delayed reconstruction. A few phrases have been especially memorable (although I feel that the true meaning is lost somewhat in translation). She encouraged women to expect the final aesthetic outcome of any delayed unilateral breast reconstruction as 'prepare for *sisters* rather than *twins*', and also acknowledged the less natural feel of the often insensate breast following reconstruction as 'feeling as though your breast is a *guest* in your house'.

There were no restrictions at all to my involvement in theatre cases. I assisted or performed parts of all cases, varying my involvement between harvesting and grafting to gain as much experience of different donor and recipient sites. Dr Kauhanen had put together a very broad range of AFG cases hand-picked from her waiting list in order to give me the full breadth of applications, as well as stages of AFG breast reconstruction. She was able to take advantage of several cancelled operating lists as many colleagues were away during a public holiday week, which resulted in me being able to benefit from a large volume of experience over a relatively short time.

Operative cases included:

1. Excision of chronic medial thigh traumatic seroma, with fat transfer to improve neovascularization. This case was performed under local anaesthetic.
2. Bilateral first-stage delayed AFG breast reconstruction, recruiting skin using a perforator (Gothenburg) flap on one side and upper abdominal advancement on the other, with first-stage fat grafting bilaterally.
3. First-stage tuberous breast correction, using fat transfer to lengthen the nipple-to-inframammary fold length and reduce areolar protrusion, and breaking down the fibrous construction ring using rigotomy.
4. Fourth-stage delayed reconstruction using AFG, highlighting the need to consider tertiary donor sites as all common sites had been previously harvested. We used an infragluteal donor site, requiring careful patient positioning. I was also introduced to the 'onion' external prosthesis, which is composed of multiple layers which are serially removed as the reconstruction process progresses.
5. Liposuction and excision of fat necrosis following AFG reconstruction in 2011.
6. Revision of previous immediate DIEP which had required post-reconstruction radiotherapy. Fat was harvested from the fuller upper outer pole and transferred to the emptier upper and inner breast and to increase projection. This case was performed under local anaesthetic.
7. Revision following localized skin necrosis after skin-sparing mastectomy and subpectoral implant-based reconstruction. This was an emergency case which required debridement and split skin graft.

Case 2: Bilateral first-stage delayed AFG breast reconstruction

This case was a great opportunity to understand both how to start the AFG reconstruction process, as well as how to optimise the reconstruction by recruiting as much skin as possible. This was done using a lateral thoracodorsal (Gothenburg) flap (39) on the right side and upper abdominal advancement on the left, with first-stage fat grafting bilaterally. In particular, Dr. Kauhanen

stressed the importance of the first stage of grafting in setting the footprint of the reconstruction. She observed me graft strictly within the boundaries of this footprint, keeping to 1cm within the pre-operative marking in order to optimize shape.

Pre-operative and intra-operative photographs showing redundant soft tissue utilised for lateral thoracodorsal flap harvest



In contrast to my the usual expectation following simple mastectomy, Dr. Kauhanen is particularly happy when women present requesting delayed reconstruction who have been left with redundant skin, because this then presents more options for skin recruitment.

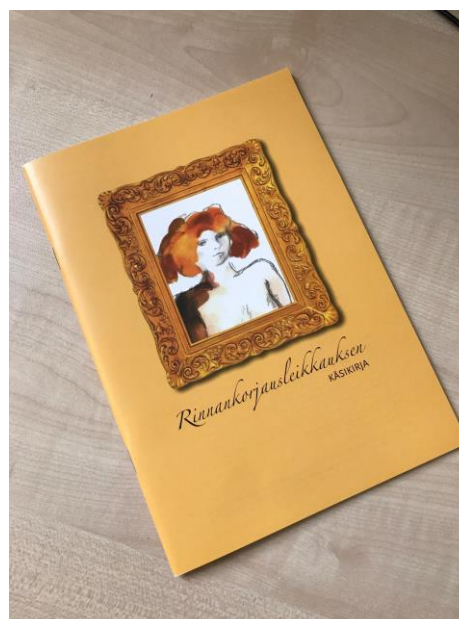
My Observations

There were certainly several significant differences in the practice I observed in Jorvi compared with my experience in the UK. Perhaps most striking was the lack of restriction or rationing of equipment, devices

and procedures (e.g. breast reduction, breast asymmetry correction etc.), in a country with a comparatively small population and generous health budget. Dr. Kauhanen explained that this situation is now beginning to change, and the service is likely to look very different in the coming decade. These types of procedures are classified as 'Tier 3' in terms of urgency, and therefore are subject to the longest waiting lists (approximately 6 months). Initiative lists are becoming necessary to combat these waiting times, which is adding financial pressure. It may be that operating list design and theatre utilization also changes in the coming years, as to my surprise all lists are booked to finish by 3pm which is considered the end of the normal working day.

The patients (very much in keeping with my previous experience of Finns) are pragmatic, uncomplaining and very practical in nature. They have little reservation regarding nudity, and certainly the 'curtains' between bed-spaces were of such light material that they served little function. Furthermore, there is no formal written consent carried out pre-operatively. The pre-operative counselling and discussion in the outpatient setting is extensive and thorough, and the unit have developed a wealth of their own written information leaflets describing the processes and recovery in detail.

HUS Breast Reconstruction Patient Handbook



The plastic surgery unit is virtually entirely paperless in terms of medical records (in-patient and out-patient, theatre records, medical photography etc.). As everything is digital, there seemed to be an abundance of computer terminals in each complex, and certainly one terminal for every surgeon in the operating theatre to enable dictation of the surgical operation note. Quite uniquely, this dictation was undertaken in Latin. The main language spoken between healthcare professionals was Finnish, interspersed with English words where no appropriate Finnish equivalent exists (e.g. Gram-negative). However, there is a significant minority of Finns in the south of the country whose main native language is Fenno-Swedish, and when they encounter each other in the hospital, seem to automatically switch to this as a reflex. Everyone without exception spoke impressive English (including the patients), and so visiting without a knowledge of Finnish would not have been a problem at all.

General health and physical activity is encouraged both of the patients and the staff. The corridors in the hospital (and in particular the main theatre complex) are extremely long,

I was particularly interested in considering what aspects of the practice at Jorvi have resulted in such good outcomes. Overall, the team truly believe that the worth of the team as a whole is greater than the sum of its parts. Perhaps most impressive was the care taken in considering every stage of a patient's treatment in great detail in order to optimise each and every factor that has the potential to affect outcomes. This included careful pre-operative planning and patient selection, and meticulous peri-operative care: always having the same theatre team and anaesthetist where possible; initiating patient warming immediately post-operatively if not before; and considering how much volume is required at each fat-grafting session in order to exploit each donor site appropriately. The utmost care was taken with the donor site, which I believe is easy to neglect. It is the donor site which can cause the patient the most morbidity, and therefore critical to manage well, especially in procedures undertaken

so the management is kind enough to provide scooters to aid the timely movement of staff.

Scooter for use in the wards and theatre complex



Equally, patients are expected to do their share of physical activity. The recovery room in day-surgery is designed as a buffet, encouraging patients to dress themselves early in the post-operative period, and enjoy coffee and a buffet lunch with the other patients before discharge.

using local anaesthetic alone. I now appreciate more acutely the importance of good intra-operative analgesia and have seen how local and regional anaesthesia can replace general anaesthesia in a variety of these procedures.



One significant barrier to translating this form of reconstruction to the UK is likely to be the cost of the equipment. Large volume transfers do require the use of a water-assisted system such as the Body-

jet® (HumanMed AG) in order to minimize operating time, but Dr Kauhanen's cost analysis suggests that this might be mitigated by shorter hospital stays, lack of implants/mesh and lower need for future revisional surgery.

Overall, the trip was superbly organised by the receiving hospital. They are well-experienced with observers and visiting surgeons and were more than happy to welcome me into the team for the week. The cases were meticulously chosen from the waiting list to reflect the full breadth of application and patient selection that fat grafting has to offer. There was minimal paperwork to complete, (which I simply declared that I was not expecting to receive any payment), and to my surprise there were no occupational health clearances needed.

The only caution I would give to anyone hoping to visit this unit is to consider the time of year during planning, as the winter



in Finland can be quite harsh and both my outbound and return flights were delayed for heavy snowfall.

I returned more eager than ever to extend the applications of this technique beyond its traditional indications of subtle touch-ups and volume correction, and have seen how readily large volume grafts can be achieved when I used the technical tips I was taught (take your time, don't cut corners, listen for the 'crunch' to fill where you haven't been before, pronate/supinate when harvesting), producing a fully autologous, sensate, natural-feeling and ageing breast.



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