



Restoring health and saving lives: global benefits from RCA's trail blazing

A project of the Regional Cooperative Agreement for Research, Development and Training in Nuclear Science and Technology in Asia and the Pacific (RCA)

Every year millions of people around the world undergo surgery during which tissue graft materials are used to assist in the treatment of their condition and help them to return to a healthy life. Tissue graft materials include skin, bone, nerves, tendons and even cornea.

For decades these procedures were almost prohibitively expensive for developing countries, because the materials such as sterilized bone, skin and other tissues were not available locally and had to be imported from developed nations at high, and ever increasing, expense. For example the cost of 30 grams of bone chips to fill a hole in a bone cavity caused by a tumour cost some USD 3,000 in the mid 1990's and the cost of a major bone for an arm or leg cost USD 10,000. Such high costs put this type of treatment out of the reach of the majority of patients in developing countries.

To address this situation the RCA took the initiative and designed a project to help national health authorities in Asia-Pacific countries build up the regional and national infrastructure for production of tissue graft materials that were sterilized using nuclear radiation. This was implemented with the financial and technical support from the IAEA. A key aspect of the production of tissue graft materials is sterilization. All tissues for grafting have to be carefully sterilized to both reduce the risk of the host body rejecting the grafted tissue and also to prevent any disease or infection being transmitted to the recipient. In the past, steam and chemical methods were used, but these methods had limitations because of either physically or chemically affecting the tissue or leaving potentially dangerous chemical residues. Radiation sterilization, mostly using gamma rays from a Cobalt-60 source, is better than these processes because it can sterilise without producing these negative side effects.

The radiation sterilization of the tissues was but one aspect of the bold RCA approach. It was recognised that to make an effective impact an holistic approach had to be taken. The project needed to address the whole process and set about the development of the facilities and the expertise to collect, sterilize and store tissues and the establishment and use of local 'tissue banks' to reducing costs and making tissue transplant treatment more widely available to those in need locally and regionally.

A tissue bank is just like a blood bank, except that instead of blood, it procures and stores human and/or animal tissue allografts such as musculo-skeletal tissues (bone, tendon, cartilage, ligament), soft tissues such as amnion and skin, and others including cornea, heart-valve and nerve tissues - all the tissues used in orthopaedic and plastic surgery.

Importantly the project developed a total quality assurance system and regulatory guidelines to ensure that these tissue banks could operate at the highest international standards. It also channelled advice, expertise, training and infrastructural support (such as the installation of specialised equipment) to the participating countries so that they could provide for their national needs. The project produced a draft curriculum on tissue banking - the first of its kind in the world - and at the same time this met the international standards laid down by the European Association of Tissue Banks (EATB) and the American Association of Tissue Banks (AATB).

In partnership with the Singapore Government, the RCA converted the original draft curriculum into a multi-media course, which formed the basis of a one-year distance-learning IAEA/NUS Diploma Course in Tissue Banking for tissue bank operators, with certification by the National University of Singapore (NUS). This course has subsequently provided training to a total of more than 130 tissue bank operators from 14 Asia-Pacific countries. By reducing the dependence on imported tissue, there have been savings of millions of USD. By introducing radiation sterilization techniques and making tissue graft materials much more widely available local surgeons have been trained and have new skills in the utilisation of grafting techniques. This has all had a huge impact on national health care in the region and the added value from the human benefit is incalculable.



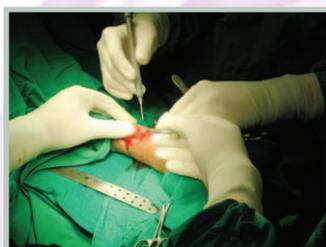
Practical Hands-on Session for the Tissue Convocation Ceremony of 1st Batch, 16 October 1998.

However these achievements are just the tip. There have also been global spin-offs from this RCA initiative. The multi-media curriculum was taken up in Latin America and translated into Spanish. Tissue Bank Training Centre in Singapore was reconstituted as an *International* Training Centre to make the tissue bank curriculum available globally. The RCA, with IAEA funds and expertise, converted the multi-media course into an online curriculum for internet delivery and tissue bank operators have been trained in Latin America (Brazil, Chile, Cuba, Peru, Uruguay), Europe (Greece, Slovakia, Poland, Ukraine) and Africa (Zambia, Libya, Egypt, Algeria).



Bank Operators during first Diploma Course held in November 1997.

The impact of this RCA project has been far reaching and has achieved a global impact. The success owes much to the resolve of the participating RCA countries to cooperate, collaborate, and demonstrates the power and progress that can come from the synergy.



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[IAEA/NUS Multi-Media Curriculum developed in April 1998 by NUH Tissue Bank with funds from the Singapore Government]

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