Aerobic Exercise and HIV

By Joanna Griffin (VSO physiotherapist, Gondar University Hospital)

Physical disability in people living with HIV is common and has been associated with fatigue and diminished physical functioning (Cade et al 2004). Between 31% and 62.3% of patients with HIV have reported a limitation of at least one physical activity as a result of fatigue and approximately half of adults with HIV who report fatigue also report a chronic inability to participate in activities of daily living (Cade et al 2004). This clearly demonstrates the link between HIV related fatigue and disability.

Fatigue related disability in people with HIV is thought to be related to an impaired oxidative metabolic process during physical activity. Possible mechanisms behind this include structural and inflammatory muscle abnormalities, cardiovascular abnormalities, anaemia and reduced physical conditioning. These impairments are likely to be a result of both the HIV infection itself and HAART (highly active anti retroviral therapy) (Cade et al 2004).

Although physical deconditioning is unlikely to fully account for the fatigue related to HIV infection, research has suggested that a training effect can be achieved. An improvement in physiological outcomes related to oxidative metabolism in people with HIV have been demonstrated following exercise training. It is likely that these improvements will also reduce fatigue and disability associated with HIV. Furthermore, aerobic exercise training in people living with HIV has also been found to be safe and unlikely to affect immunological function (Cade et al 2004).

A study undertaken by Filipas et al (2006) demonstrated that a six-month supervised aerobic and resistance exercise programme improved cardiovascular fitness in a small population of adult men with HIV. In addition to improved cardiovascular function, the exercise programme was also found to improve self efficacy in the study population.

Self efficacy has been associated with better immunological outcomes for people living with HIV and is strongly correlated with medication adherence.

Health related quality of life was also evaluated following the supervised exercise programme and it was found that ‘overall health’ (general health perception, feeling of well being and cognitive function) also improved.

Although further research needs to be undertaken in the area of aerobic exercise and the management of HIV, the current literature supports its use in improving cardiovascular fitness, self efficacy and other aspects of general health.

Having reviewed this literature, the physiotherapy department at Gondar University Hospital plans to develop a regular supervised exercise programme for people with HIV and run it as a pilot scheme as a health promotion and disability prevention measure. The progress of this will be followed in future editions of EthioPhysio.

References
During the course of HIV infection, there is slow progressive loss of CD4 lymphocytes (CD4 < 200 = AIDS) and abnormalities in the function of other killer cells (i.e., alveolar macrophages, natural killer cell activity), so HIV and AIDS can affect different systems of our body, that can hasten illness and death if not treated early.

Among the many clinical manifestations of HIV and AIDS, cardiac and pulmonary impairments are the most obvious.

Some cardiac manifestations include cardiovascular malignancy, endocarditis, myocarditis, pericardial effusion, pericarditis, coronary artery diseases, and CHF.

Pulmonary complications are often the initial clinical manifestation of HIV infection. Pneumonia and respiratory failure are the most common causes of death in the late stage of HIV infection.

Many pulmonary opportunistic infections in HIV-infected patients are due to endogenous reactivation of previous acquired organisms, with the most common communicable pulmonary infection being tuberculosis. Patients with HIV and TB infection may have as high as 8% per year risk of developing active tuberculosis. Active TB appears to accelerate the course of HIV.

The occurrence of certain fungal and parasitic infections depends on the prevalence of infection in the local population. Bacterial pneumonias can occur at any stage of HIV and AIDS, but can occur most commonly as HIV advances and CD4 count declines. Upper respiratory tract infections such as bronchitis and sinusitis also occur with increased frequency in patients with HIV at any level of immune suppressions, but incidence increases as CD4 count declines.

Other pulmonary manifestations of HIV and AIDS include:

- Pneumocystic carinii pneumonia (PCP)
- Fungal pneumonia
- Pulmonary neoplasms
- Pleural effusions

Generally, because HIV and AIDS can affect cardiac and pulmonary systems, patient’s cardiovascular fitness will decline. So prevention, treatment, and rehabilitation of cardiopulmonary impairments are of great importance in the management of patients with HIV and AIDS.

Physiotherapy can help these patients by improving cardiopulmonary endurance, thereby enhancing exercise capacity.

References:
- www.hopkins.aids.edu/diagnosis
- www.d3jointline.tripod.com

For comments or questions, e-mail muluphysio@yahoo.com.
Cardiopulmonary dysfunction, in which oxygen transport is threatened or impaired, results from different factors such as cardiopulmonary pathophysiology, bed rest (recumbency and restricted mobility), extrinsic and intrinsic factors, among others.

An analysis of those factors that contribute to cardiopulmonary dysfunction provide the basis for assessment and prescribing the parameters of rehabilitation techniques to enhance oxygen transport for a given patient. The treatment is directed at the specific underlying contributing factors.

Dear readers, for today I want to discuss about positioning and its effect on cardiopulmonary dysfunction.

Positioning and mobilization have profound acute effects on cardiovascular and cardiopulmonary dysfunction and hence on oxygen transport. Although the primary aim of physiotherapy is to reduce the adverse effects of restricted mobility, including pulmonary complications, bed sores, and contractures, it could also be used as a primary treatment intervention to enhance oxygen transport.

To stimulate the normal physiologic body position, the primary goal of physiotherapy is to get the patient upright and moving. Mobilization and exercise are the most physiologic and potent interventions to optimize oxygen transport and aerobic capacity.

In upright position, the intrapleural pressure becomes less negative and it also stimulates the sympathetic nervous system which offsets impaired blood volume and pressure regulating mechanisms. Although their negative effects have been well documented for several decades, supine and recumbent positions are frequently assumed by patients in hospital. These positions are non-physiologic and are associated with significant reduction in lung volume and flow rates and, of course, increase work of breathing.

Bed rest deconditioning has been attributed to the reduction in blood volume and the impairment of volume-regulating mechanisms rather than physical deconditioning per se. Thus the upright position is essential to maximize lung volumes and flow rates. This position is the only means of optimizing fluid shifts so that the circulating blood volume and volume-regulating mechanisms are maintained. The upright position coupled with movement is necessary to promote normal fluid regulation and balance.

The benefits of side-to-side positioning, on the other hand, will be enhanced if applied in response to assessment rather than routinely. Adult patients with unilateral lung disease may derive greater benefit when the affected lung is uppermost.

Prone position has long been known to have considerable physiological justification in patients with cardiopulmonary compromise, even those who are critically ill with acute respiratory failure and patients with trauma-induced adult respiratory distress syndrome. The beneficial effect of prone position on arterial oxygenation may reflect improved lung compliance secondary to stabilization of the anterior chest wall. However, despite compelling evidence to support the prone position, it may be poorly tolerated in some patients. In these situations, intermediate positions approximating prone may produce many of the beneficial effect and minimize any potential hazard.

Positioning for drainage of pulmonary secretions may be indicated in some patients. These positions have been based on the anatomical arrangement of the bronchopulmonary segment to facilitate drainage of a particular segment. The bronchiole to the segment of interest is positioned perpendicular to facilitate drainage with the use of gravity.

Body positioning, including the specific position selected, the duration of time spent in each position, and the frequency with which the position is assumed, is based on a consideration of factors that contribute to cardiopulmonary dysfunction.

Treatment response, understanding cardiovascular and cardiopulmonary physiology, and the effect of disease highlight certain positions that are theoretically ideal. However, these positions need to be modified or may be contraindicated for a given patient based on careful consideration.

A continuation of this article will appear in next month’s issue of Ethio Physio.
In Focus: Gondar Disabled Vocational Rehabilitation Center

By Elancheran Kanniyappan (UNDP physiotherapist, Gondar University Hospital)

The organization is nicknamed “Abo Sefer”. It is situated in Kebele 06, Kirkose district area, North Gondar. On entering the compound, we can see eye-catching activities carried out by people with different disabilities.

Background
It was established and opened by Emperor Haile Selassie in the Ethiopian year 1963 (E.C.). It was started as a home for disabled people, and it has provided food, shelter and medical facilities.

Gbrekidan Dubbale was the first person to work in the center. It was under the Gonder Municipality until 1974 (E.C.). From that time, the center started to give informal training in weaving, woodwork, and sewing using informal methods, and the center was administered by the rehabilitation organization under the Ethiopian Administration System until 1988 (E.C.).

From 1989 (E.C.) this organization was taken over by BOLSA (Bureau of Labour and Social Affairs). The objective was to provide training in physical and vocational rehabilitation in order to encourage self-sufficiency and to participate in the development process of the country. It continued to develop and now has become the only center to provide Physical and Vocational services in the Amhara Region.

Present Day
For the past nine years the organization has been headed effectively by Momina Mohammed. She has put a lot of effort to improve the organization with the support of Ato Hiruy Bahretibeb, a Social Affairs Expert. There are 36 workers in all fields.

The center is funded by BOLSA. From 1996 to 2002 (E.C.), the center has given training for 646 disabled in different areas.

Here the training is given under 2 sections:
1. Vocational rehabilitation
2. Physical rehabilitation

Under vocational rehabilitation the training is given under the following sections:
1. Metal work
2. Wood work
3. Sewing
4. Printing and dying
5. Weaving and mat production

The trainees are selected on the basis of their disability, poverty level and interest. They are selected from the Amhara Region.

The course duration is one year divided into two sessions.

During the training, the trainees are provided with free shelter and training. The food is financed by the trainee although it is supported by the Gonder Community Based Rehabilitation (CBR) program, Missionaries of Charity, the woreda administration, other people with disabilities, and by workers of this organization who contribute money every month.

During training, outside orders are taken, materials are produced and sold, and the income is used for the further development of the center.

After successful completion of training, the center continues to support the trainees by helping them to find work or set up their own units in their field. It’s great work!

Future Plans
The center plans to expand its training in the following fields:
1. Electronic equipment maintenance
2. Leather products
3. Knitting
4. Production of ploughing materials
5. Information and communication technology
6. Beauty salon

Under physical rehabilitation, the center is involved in making crutches, walkers, wheelchairs, and corner chairs for cerebral palsy; maintaining wheelchairs and artificial limbs; and modifications of shoes.

Future Plans
1. The establishment of a prostheses and orthoses center
2. An increase in wheelchair production
3. The provision of more physical rehabilitation services

Currently the center is working in collaboration with
- The Physiotherapy Department, Gondar University Hospital, Gondar
- Gonder CBR
- Missionaries of Charity
- Bahir Dar Prosthesis and Orthosis Center
- Dessie Prosthesis and Orthosis Center

- Five other disability associations
- The center accepts support from different organizations, individuals and NGOs in
- Funding for further development
- Materials (wood, metal, and leather) for training
- Materials to set up a prosthesis and orthosis center
- Computers
- Sewing machines
- Building for future training, workshops, and dormitories
- Furniture
- Assistance with the provision of food and medical facilities for trainees
- Assistance with the development of web page

“The center welcomes the expertise provided by volunteers in training learners in different areas in development of the center.”

The center opens Monday to Friday.

Contact Persons:
Momina Mohammed
Head
Mobile: 0918 778041
E-mail: momabunur3@yahoo.com

Ato Hiruy Bahretibeb
Social Affairs Expert
Mobile: 0918 774423
E-mail: hrybbt@yahoo.com

Center Landline No.: 0581 120736
0581 110072
E-mail: disabletrain@yahoo.com

Also can be contacted through BOLSA:
Ato Daniel Kassa
Mobile: 0914 710045
E-mail: nebdkam@yahoo.com

Please extend your support to this non-profit center.

The author with Ato Hiruy and Ms. Mohammed