South African Journal for Research in Sport, Physical Education and Recreation, 2017, 39(1): 41 - 49.
Suid-Afrikaanse Tydskrif vir Navorsing in Sport, Liggaamlike Opvoedkunde en Ontspanning, 2017, 39(1): 41 - 49.
ISBN: 0379-9069

EVOLUTION OF THE PROFESSION OF BIOKINETICS

Terry J. ELLAPEN & Mariëtte SWANEPOEL
Physical Activity, Sport and Recreation, Faculty of Health Science, North-West University, Potchefstroom, Republic of South Africa

ABSTRACT

The profession of Biokinetics has been undergoing significant evolution over the last decades. This paper provides an overview of the history of Biokinetics and the progressive changes to the professional bodies regulating the profession. These changes include the formulation of the Professional Board of Physiotherapy, Podiatry and Biokinetics, Biokinetics Association of South Africa (BASA), BASA's Life through Movement Conference, new Biokinetics emblem and the new proposed professional Biokinetics degree. A critical review of the benefits and challenges of the proposed professional Biokinetics degree are presented. A rationale for a scientific Biokinetics journal is proposed.

***Key words*:** Biokinetics; Evolution; Progress; Health.

INTRODUCTION

The profession of Biokinetics is a specialisation field, which developed from the South African Physical Education Programme and could be traced back to the 1930s (Jooste, 1954). The pioneering work of Dr. Danie Craven, Dr. Ernst Jokl and Prof. Gert Strydom has led to the development of the profession of Biokinetics (Strydom, 2005). Although Biokinetics cannot claim to have developed a new health care profession, it has, however, succeeded in an innovative application of existing knowledge (Strydom, 2005).

Biokinetics was born out of the philosophy that *exercise is medicine*. This salutogenic effect of exercise can be traced back to the 5th Century BC when Hippocrates prescribed exercises to improve the medical status of his patients (Ryan, 1984). Moses Maimonides, the Jewish philosopher-physician expresses his sentiments concerning exercise and health as follows:

> Anyone who lives a sedentary life and does not exercise, even if he eats good food and takes care of himself according to proper medical principles, all his days will be painful ones and his strength shall wane. (Ryan, 1984:3)

The empirical evidence supporting this quotation was provided eight centuries later in the Report of the Surgeon General of the USA (1996) providing salutogenic evidence that exercise is medicine (Strydom, 2005).

Biokinetics is concerned with improving the physical and health status and quality of life of an individual through individualised assessment and exercise prescription in the dual context of clinical pathology (acute and chronic) and clinical performance enhancement (HPCSA, 2013). In addition to the above-mentioned, the profession is also actively involved with health promotion and the prevention of injury and hypokinetic diseases, which encourages a positive

shift on the wellness continuum towards optimal well-being and salutogenic living (Robbins *et al*., 1991). Biokinetics is a clinically trained profession to address inter alia the serious concerns of the non-communicable diseases (NCD) in South Africa through a structured exercise rehabilitative intervention (BASA, 2016).

Physical inactivity is the 4th leading risk factor in the development of cardiovascular diseases and can be dramatically altered by means of structured exercise interventions and monitoring. Biokinetics is not a longstanding member of the former South African Medical and Dental Council (SAMDC) compared to the other health professions, such as Physiotherapy and Occupational Therapy, which were established in 1924 (Bakewell, 1997) and 1945 (Quiroga, 1989) respectively.

Collaborative efforts of the official recognition of a clinical exercise rehabilitative health profession began at the University of Potchefstroom in 1969. The heads of the Human Movement Science Departments from the South African universities drafted a formal letter requesting SAMDC to include Kinesiotherapy (1973) onto a register of the SAMDC. The initial name considered for Biokinetics was Kinesiotherapy, suggested by Prof. Gert Strydom, but the progression was delayed due to possible confusion of the suffix "therapy" with other health disciplines, such as Physiotherapy and Occupational Therapy (Strydom, 2005; Nel, 2014). However, this delay was not the end of the struggle in the development of this profession. Prof. Strydom continued various discussions with the SAMCD and on the 9th of September 1983 the profession of Biokinetics, as a health discipline, was officially announced in the South African Government Gazette (Strydom, 2005). Subsequently, the name was changed to Biokinetics ('Bio' meaning *life* and 'Kinesis' meaning *movement*) (Strydom, 2005). This historical event occurred after a 17-year-long process of deliberations with other health professions and the SAMDC. Serious resistance to the acknowledgement of Biokinetics existed not only from other clinical professions, such as Medicine, Physiotherapy and Occupational Therapy (Strydom, 2005), but also from Exercise Science (Charteris, 1985).

The metamorphosis of the profession, being the progressive changes to professional bodies regulating the profession of Biokinetics, will be discussed under the following categories: Health Professions Council of South Africa, Biokinetics Association of South Africa and the new professional Biokinetics degree.

HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA (HPCSA)

On 3 November 1982, the former SAMDC informed the Committee of the Heads of Physical Education Departments of South African Universities, that Biokinetics is accepted as a health profession and should be included as part of the register of Medical Sciences (Strydom, 2005). The SAMDC requested the scope of Biokinetics to be clearly defined to prevent encroachment onto the scope of practice of similar professions, such as Physiotherapy and Occupational Therapy (Strydom, 2005). In the late 1990s, the SAMDC were undergoing restructuring, which led to the establishment of various health professional boards that guided these health professions (Nel, 2014). Health professions with a similar scope of practice were grouped under a specific health professional board. In 1998, the Professional Board of Physiotherapy, Podiatry and Biokinetics (PPB) was established to protect the public and guide the profession

accordingly (Nel, 2014). Subsequently, in 1999 the SAMDC changed its name to the Health Professions Council of South Africa (HPCSA) (Nel, 2014).

Initially the administrative responsibilities of Biokinetics, were designated to a sub-committee of the South African Association of Sports Science, Physical Education and Recreation (SAASSPER). SAASSPER was at this stage a custodian association guiding all the professions of Human Movement (Strydom, 2005). During that time, SAASSPER comprised of the following groupings: Exercise Science, Sports Science, Physical Education and Recreation. Physical Education was the formal area of educational activity in which the main concern was with human movement taking place in an education facility (Kent, 2005). Recreation was the study reflecting physical activity pursuits for the enjoyment and refreshment of the health of the individual. Recreation is synonymous with the term Leisure (Kent, 2005). Sports Science involves the study of the application of exercise to enhance human movement and performance, while Exercise Science focused on the human body in a clinical exercise context, describing the salutogenics of physical exercise, hypokinetic diseases and sports injuries. The profession of Biokinetics was established from Exercise Science (Strydom, 2005). SAASSPER also hosted annual conferences and published a scientific journal that disseminated scientific literature pertaining to the various disciplines of Human Movement in South Africa. However, if the new profession of Biokinetics was to survive and develop, a professional body of its own had to be established.

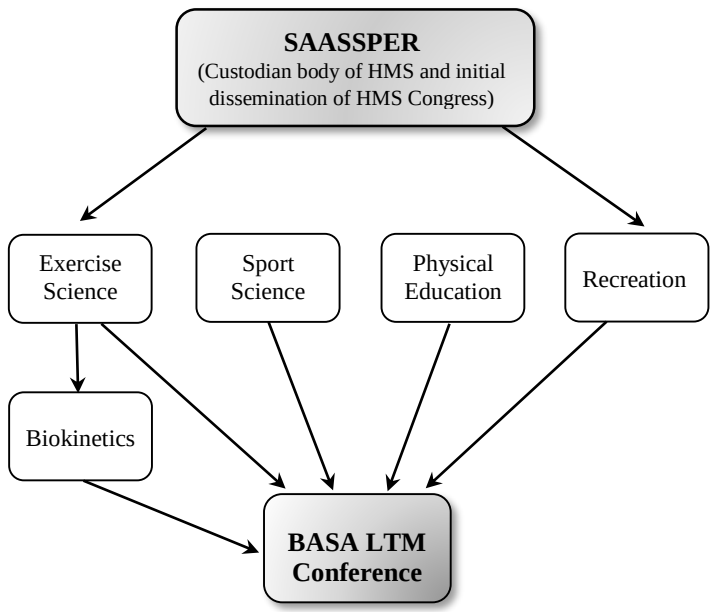

Figure 1. **CATEGORISATION OF HUMAN MOVEMENT SCIENCES AND DISSEMINATION OF LITERATURE**

BIOKINETICS ASSOCIATION OF SOUTH AFRICA (BASA)

On 17th October 1987 in Potchefstroom, then called South African Association of Biokinetics (SAAB) was constituted and the first office bearers were elected. They were Prof. G.L. Strydom (PUCHE), Prof. J.M. Loots (UP), Prof. M.F. Coetzee (Unizul), Dr. J.F. Cilliers (SADF), Dr. D. Malan (PUCHE), Ms. M. Delport (PUCHE) and Mr. H. Daehne (UP) (Strydom, 2005). Consequently, the name of the Association was changed to the Biokinetics Association of South Africa (BASA, 2016). The primary function of BASA was and currently is to serve the biokineticists, intern biokineticists and the student biokineticists-in-training (Nel, 2014). A student biokineticist-in-training would be completing a Biokinetics degree and would register with BASA and HPCSA as a student-in-training. Whereas, an intern biokineticist is a student biokineticist who has successfully completed his/her theoretical fulfilment of the degree of Biokinetics, but is currently completing the final year of internship. An intern biokineticist is registered with HPCSA as an intern biokineticist (Nel, 2014). Strydom (2005) recommended that the only way to develop a solid and dynamic Biokinetics profession is by training and developing high-quality and skilled professionals. The acquisition of high-quality professionals can inter alia be achieved in the following ways:

- Professionals keeping abreast with the latest scientific knowledge and developments.

- Continued learning initiatives, such as CPD accredited workshops and seminars. Road shows organised by the BASA educating its members on the qualities of a well-respected profession.

- Attending BASA Life through Movement Conferences (LTMC). Biokineticists should attend this conference as an expression of their pride to be part of the profession. It is recommended that all biokineticists, students-in-training and intern biokineticists diarise this conference as a 'must-attend' event. In 2012, the Inaugural BASA Conference was successfully presented at the North-West University, Potchefstroom Campus (BASA, 2016). The BASA Conference is an open academic and student conference highlighting all scientific developments in sport medicine, biokinetics rehabilitation, kinderkinetics, exercise science, physical education and recreation. Additionally, various workshops are presented. The BASA LTM Conference presents several merit awards, which include category A, Advancement in Biokinetics Practice; category B, Research (B1=Premium Scientific, B2=Young Researcher, B3=Scientific, B4=Student Researcher); category C (Merit); and category D, Contribution to Life through Movement outside the profession of Biokinetics.

- Initially SAASSPER presented an open academic and student congress, highlighting all the scientific developments in Exercise Science, Sports Science, Physical Education and Recreation. Unfortunately, these congresses were terminated in the 1980s. In the 1990s there was a period of minimal dissemination of Human Movement scientific developments via congress presentations. During this paucity of the dissemination of Human Movement scientific literature, the South African Sports Medicine Association (SASMA) emerged as the leading sports medicine congress that presented sports medicine and physiotherapy, sports injuries, rehabilitation and sport science research and workshops. Furthermore, the South African Sport and Recreation Department, in collaboration with the Department of Education, also started hosting a conference to disseminate recreation and sport science developments.

This was called SASReCon. Presently, BASA LTM Conference alternates each year with the SASMA Congress.

- The development of a scientific journal containing the latest scientific developments in Biokinetics is a necessity. Currently, Biokinetics research is being published in the *African Journal for Physical Activity and Health Sciences, South African Journal for Research in Sport, Physical Education and Recreation, South African Journal of Sports Medicine* and *international journals*. The inaugural editions of the *South African Journal of Physiotherapy* and the *South African Journal of Occupational Therapy* were released in 1948 and 1953, 24 and eight years, respectively, after their registration with SAMDC (Concha, 2014). It has been 33 years after the profession of Biokinetics was officially registered with the SAMDC, which warrants the publication of an official Biokinetics journal. The profession of Biokinetics should follow a similar pursuit of the above-mentioned related professions that have released official professional journals, which has assisted in enhancing their professions (Concha, 2014).

  The authors of this paper postulate that a journal be published quarterly, containing the latest Biokinetics related literature which will enhance the development of the profession. The Biokinetics journal should have a format similar to other official professional journals, such as original research articles, short communications, case studies, review articles, letters to the editor, conference announcements and advertisements of employment opportunities. In addition to this, the proposed Biokinetics journal must be accredited by the Department of Higher Education of South Africa and provide an opportunity for subscribers to accrue CPD points from short exercises in this publication.

- Respecting the scope of practice of fellow health professionals. There have been anecdotal reports that Biokineticists have encroached on the scope of practice of Physiotherapists. Biokineticists must refrain from any dubious practice that could be seen as encroachment on the scopes of other professional bodies. A Biokineticist provides final phase rehabilitation of sport and orthopaedic injuries through the modality of exercise therapy, which is based on scientific evidence and personalised exercise prescription. They administer exercise rehabilitation for patients with chronic disease, hypokinetic and NCDs. Health and wellness promotion and the maintenance of physical abilities, as well as specialised physical activity programme prescriptions, lie within the scope of Biokinetics practice (HPCSA, 2013).

  A physiotherapist assesses, provides initial treatment of injuries including ailments from the fields of orthopaedics, neurology, respiratory and thoracic, cardiovascular, obstetrics, sports medicine, paediatrics, geriatrics, intensive care units and general rehabilitation (HPCSA, 2013). It is further recommended that the regional Biokinetics Associations should schedule regular seminars, discussing the scope of Biokinetics and other related professions, thereby informing all of their scope of practice, as well as other similar professions, such as Physiotherapy and Occupational Therapy.

- Collaborative research is a fundamental step to enhance the character of the profession of Biokinetics. Collaborative research with Physiotherapy, Occupational Therapy, Athletic Training and Sports Medicine will help Biokineticists to develop new rehabilitative techniques and improve the image of the profession in the clinical fraternity. Collaborative research between the various disciplines will foster respect among them.

CHANGE OF BIOKINETICS EMBLEM

There have been several changes to the initial Biokinetics emblem or logo. The first emblem was not a medical emblem, although it involved some characteristics of the medical emblem, but then it was changed to the Leonardo Di Vinci Vitruvian man. The Vitruvian man was changed to the presented emblem. The second BASA emblem was not trade marked as the official BASA emblem, which results in other social clubs adopting it. Furthermore, the acronym BASA was nearly lost due to another company subscribing to the same acronym. Legally nothing could be done to secure this emblem as a trade mark of BASA. In 2012, the executive committee of BASA decided to change the emblem. BASA employed five different marketing companies to design a new emblem in accordance with the scope of practice of the profession of Biokinetics. The emblems submitted were all quite different. The executive committee members of BASA voted on their preferred emblem, resulting in the present logo.

Figure 2. **BIOKINETICS EMBLEMS THROUGH THE YEARS**

NEW PROFESSIONAL BIOKINETICS DEGREE

Initially, the Biokinetics programme entailed a three-year undergraduate degree in Human Movement Science or an equivalent (such as Human Kinetics and Ergonomics) followed by a honours degree specialisation in Biokinetics (3+1 model). In their post graduate year of study (4th year), students start their two years of professional internship (Nel, 2014). During the fourth year of training the student is required to register with the HPCSA and BASA as a student biokineticist-in-training, thereby allowing eligibility to start their professional internship. However, during the fifth year, the student biokineticist-in-training must register with BASA and the HPCSA as an intern biokineticist (BASA, 2016). In the fifth year, the intern-biokineticist must secure internship at private Biokinetics practices and biokinetics training institutions that are accredited by BASA, as well as the HPCSA. Presently, a biokinetics internship is not offered at municipal hospitals and/or clinics, unlike the professions of Physiotherapy and Occupational Therapy, which must be completed as one year of community service, before they may register as an independent practitioner. During this year, they are registered as a community service professional working under supervision, but not receiving a salary.

Presently there are 12 Biokinetics training institutions in South Africa, namely: the University of Johannesburg (UJ), University of Pretoria (UP), North-West University (NWU), University of Free State (UFS), University of Kwa-Zulu Natal (UKZN), University of Zululand (Unizul), Nelson Mandela Metropolitan University (NMMU), University of Cape Town (UCT), University of Stellenbosch (US), University of Western Cape (UWC), Tshwane University of Technology (TUT) and the University of Venda (UNIVEN). The UNIVEN, NMMU, UJ and

recently the UFS have already adopted the new professional degree, whilst the other institutions are geared to follow soon.

The primary objective of the new professional degree was to increase the amount of tuition and experiential learning within the profession of Biokinetics. In the old model of 3 + 1 the student receives formal biokinetics training only in the 4th year as opposed to receiving formal education from the 1st year in the new model. The new four-year professional degree allows biokinetics education and internship to begin early in the degree thereby improving the quality and quantity of exposure a biokineticist in training receives. The new professional degree could afford biokinetics students-in-training the possibility of placement in public clinics, hospitals, schools and old-age homes/care centres. If placement in the public hospitals are permitted, Biokineticists must refrain from overreaching their scope of practice that could lead to encroachment onto the scope of practice of Physiotherapy and/or Occupational Therapy. Biokineticists must recognise that their scope of practice focuses on final phase and/or non-acute rehabilitation. These clinical sites need not be officially accredited by the HPCSA, as it was in the old model (3+1) (HPCSA, 2014).

Initial resistance to gain eligibility to the public health sector was that Biokinetics students-in-training did not receive sufficient experiential training as is the case with Physiotherapy and Occupational Therapy students. Therefore, it is postulated that the new professional degree consists of similarities to the clinical experiential training as Physiotherapy and Occupational Therapy, which may negate previous resistance and may allow eligibility of the biokinetics students-in-training to the public health sector. Exposure to the public health sector will create a platform of opportunities for Biokineticists and the health of many South Africans. The presence of biokinetics rehabilitation in the public sector will be of invaluable benefit to NCD patients, who cannot afford private medical care and are dependent on the municipal health care.

Another advantage of the new professional degree is the redundancy of placement of the intern biokineticists. In the new professional degree, internship is integrated into the new curriculum, like Physiotherapy and Occupational Therapy. If Biokinetics follows the trend of Physiotherapy and Occupational Therapy with the completion of a year of community service that is provided by the public health sector, it would improve the experiential learning of the novice practitioner. At that time, the biokineticist will then be referred to as a community professional. If community service is deemed redundant, then responsibility of adequately training student biokineticists lies solely with training institutions. Hopefully, Biokinetics will then have access to public health sector. At present, most universities follow the 3+1 model and the additional year of internship. In 2013, there were 170 biokinetics practices accredited to supervise intern biokineticists (Nel, 2014). Of the 170, only 71 practices were accredited to supervise two intern biokineticists per supervisor (Nel, 2014). Nel (2014) indicated that 150 biokinetics students-in-training graduate each year from the 12 biokinetics training institutions. In 2013, every intern biokineticist (N=150) could theoretically secure final-year internship at an accredited biokinetics practice, because there were only 241 accredited biokinetics supervisors (Nel, 2014). However, many of these practices do not take on intern biokineticists each and every year, thereby creating the challenge of securing mandatory internship (Nel, 2014). The new professional degree alleviates this challenge.

Extrapolation of the proposed average biokinetics class size for the professional biokinetics degree from the South African Physiotherapy and Occupational Therapy classes, who also follow a four-year professional degree, would range from 20 to 40 students (HPCSA, 2013). It is postulated that 240 to 480 biokinetics students-in-training (12 x 20 to 40) would graduate annually if the four-year professional biokinetics degree were adopted by all 12 biokinetics training institutions. This would then pose the challenge to these prospective biokineticists to secure employment. It is postulated that this challenge can be eliminated if biokineticists are allowed placement in the public health sector.

Another concern is the loss in financial revenue to universities. Currently, the average Human Movement under-graduate class size varies from 50 to 250 students of which a favourable portion have the ambition of studying Biokinetics. By limiting the entry level of the Biokinetics class size to an approximate range of 20 to 40 students, it is postulated that undergraduate student population of Human Movement Science would drastically drop, thereby adversely impacting the financial revenue of the biokinetics training institutions. This would further erode the culture of sport and physical activity in the South African society. In addition, by increasing the number of biokinetics students-in-training presents the question as to whether the training institution has the capacity in terms of facilities and staff to accommodate this change.

CONCLUSION

The profession, *Biokinetics*, has undergone progressive revolutionary changes in the last 33 years represented by the change in the Biokinetics emblem, the BASA LTM Conference and the proposed new professional degree. It is recommended that a Scientific Biokinetics Journal be established to record the major scientific developments made in the profession and to report on high-quality Biokinetics research. Another recommendation for the future development of the profession is to red flag the probability of the training an excess of biokineticists that could challenge securing occupation.

Acknowledgement

The authors would like to express their gratitude to Prof. G. Strydom for his invaluable pioneering work in Biokinetics.

REFERENCES

BAKEWELL, S. (1997). Medical gymnastics and the Cyriax collection. *Medical History*, 41(4): 487-495.

BASA (2016). "Biokinetics Association of South Africa: Guidelines for biokineticists". Hyperlink: [http://www.biokinetics.org.za]. Retrieved on 20 April 2016.

CHARTERIS, J. (1985). What is sport science? *South African Journal of Science*, 81(9): 544-545.

CONCHA, M. (2014). Occupational Therapy at the University of the Witswatersrand: The past, the present and the future. *South African Journal of Occupational Therapy*, 44(1): 1-2.

HPCSA (HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA) (2013). "No 1746: Regulations defining the scope of practice for the profession of Biokinetics". Hyperlink: [http://www. hpcsa.ac.za]. Retrieved on 15 March 2016.

HPCSA (HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA) (2014). Completion of internships by students qualifying from the University of Venda, Thohoyandou on 22 June 2014.

JOOSTE, M. (1954). 'n Beknopte oorsig van die ontwikkeling van Liggaamlike Opvoeding in Suid-Afrika (1652-1936) (*trans.*: A synopsis of the development of Physical Education in South Africa). *VIGOR*, 7(3): 32-34.

KENT, M. (2005). *Oxford dictionary of sports science and medicine.* New York, NY: Human Kinetics.

NEL, C. (2014). An evaluation of biokinetics internships. Unpublished Master's thesis. Richards Bay, Kwa-Zulu Natal, RSA, University of Zululand.

QUIROGA, A.M.V. (1989). *Occupational therapy history: The first 30 years, 1900-1930*. Bethesda, MD: The American Occupational Therapy Association Incorporation.

ROBBINS, G.; POWERS, D. & BURGESS, S. (1991). *A wellness way of life*. Dubuque, IA: WM.C Brown Publishers,

RYAN, A.J. (1984). Lessons from the past. In H.M. Eckert & H.J. Montoye (Eds.), *Exercise and health*: *The American Academy of Physical Education* (Paper no 17: 3). Champaign, IL: Human Kinetics.

STRYDOM, G.L. (2005). Biokinetics – The development of a health profession from physical education: A historical perspective. *South African Journal for Research in Sport, Physical Education and Recreation*, 27(2): 113-128.

Dr Terry ELLAPEN: Physical Activity, Sport and Recreation, Faculty of Health Science, North-West University, Potchefstroom, Republic of South Africa. Tel.: +27 (0)182992034, Email: 28309308@nwu.ac.za

(Subject Editor: Prof Derik Coetzee)