

SPORTS AND MUSIC: A HOMOGENEOUS TRUTH

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Music plays a central role in people's everyday lives (Rentfrow & Gosling, 2003). Research shows that music can affect arousal regulation (Lukas, N. D.: Nilsson, Unosson, & Rawal, 2005), motivation (Karageorghis & Terry, 1997), and mood levels (G. feller, 1988). Research has also shown that music can be a facilitator to athletic performance (Dorney & Goh, 1992; Karageorghis & Terry, 1997; Krumhansl, 2002). For instance, music affects mood states by eliciting a certain emotional response while listening to a song (Dorney & Goh, 1992). Moreover, research has shown that music allows athletes to disassociate from feelings of fatigue and perceived exertion rates (Karageorghis & Terry, 1997).

While listening to music, a performer's attention is narrowed which can divert attention away from the sensations of fatigue during a physical activity. This process can be compared to the cognitive strategy of dissociation, which tends to encourage a positive mood state (Karageorghis & Terry, 1997). For instance, Wales (1986) supported the relationship between music and affect, finding that music that was upbeat in tempo and stimulating enhanced exercise performance by lowering anger, depression, and fatigue significantly.

In addition, previous research has shown that the tempo of music can have an effect on movement. The type of music we listen to causes us to synchronize our movements at times (Karageorghis & Terry, 1997). Consequently, if athletes listen to a fast tempo song they may be more likely to increase movements to a faster pace, which could possibly enhance performance (i.e. conditioning time, running, cycling). Likewise, for an athlete who needs slower or more graceful movements (i.e. figure skating), slower tempo music could assist in reaching optimal performance. This research supports Smoll and Schultz's (1982) view that rhythm is an important component in motor skill and performance. Athletes apply the force of rhythm and tempo to many aspects of their athletic experiences.

Moreover, music has also been shown to reduce perceived exertion rates during exercise (Boutcher & Trenske, 1990). Researchers have revealed that when exercising and listening to music, the perceived exertion rate is lowered because attention is diverted to the music. Johnson and Siegel (1987) found that fatigue was reduced significantly while participants listened to music. Boutcher and Trenske (1990) also found that participants who listened to music during a moderate workout had a reduced perceived exertion rate during exercise. This supports the hypothesis that music narrows the performer's attention and, as a consequence, diverts attention away from sensations of fatigue during exercise (Karageorghis & Terry, 1997).

Therefore, if music can affect our mood states and our perceived exertion rates, music may also affect our arousal rate. For example, researchers have shown that music can reduce anxiety in pre and post surgery patients. Before a person goes into surgery listening to relaxing music can help reduce anxiety about the surgery. Research also shows that post surgery patients can reduce their anxiety about going to rehabilitation if they listen to music before and/or during their rehabilitation session (Lukas, Nilsson, Unosson, & Rawal, 2005).

Generally, sport psychologists advise athletes to utilize music in order to prepare for competition. (Karageorghis & Terry, 1997, p.57). Gfeller (1988) suggests that music will influence arousal if it promotes thoughts that encourage physical activity or relaxation. In other words, the association between certain types of music and physical activity may act as a stimulus. If athletes need to increase their arousal level before a game they may listen to music that encourages them to go out and compete at an intense level. If athletes need to lower their arousal level before a game they may listen to a song that would allow them to relax and calm down.

Music is a significant complementary tool in prevention, therapy and rehabilitation providing medical and socioeconomic benefits. Substantial and steady progress both in research and clinical application of Music in Sports has occurred during the last 25 years.

Added to the 50 years of research and application of Music Therapy, now have solid evidence that music has reproducible effects and valuable preventive, therapeutic and rehabilitative properties.

It is proposed to define the therapeutic use of Music in Sports as Music in Sports: Music in Sports means the scientific evaluation, as well as the practical application of musical stimuli in prevention, therapy, and rehabilitation, in order to prevent disability or illness, to complement usual medical treatment, or to facilitate rehabilitation, always considering the particular disability or illness, medication and procedures involved in each individual.

This approach is much broader as compared to Music Therapy, which especially in central Europe is mainly understood as part of psychiatric care or psychotherapy. Actually, considering only this kind of Music Therapy means to neglect the by far larger part of the "market segment" for music: health care in general, including prevention and rehabilitation, even palliative care.

In the United States there is a broader approach and the combined strength of Music in Sports and Music Therapy working cooperatively with music products industry adds new fields every day.

Applications and research: Prevention (education against low-back-pain, workplace on-site exercise programs against over-use-syndromes and fatigue in the use of muscles and tendons); Therapy (chronic pain syndrome, acute stress and pain in surgery/anesthesia/intensive care, during labour, medicine therapy after cardiac stroke) and; Rehabilitation (physical therapy after trauma and surgery or stroke, work place are integration). So far most scientific research focused upon music complementing medical procedures. Collaborative studies have been and are still conducted together with several university hospitals and institutes in Europe, USA, Australia and Japan since 1975. Music is used in clinical settings where patients suffer from distress, anxiety, pain and disability.

For instance a sequence of clinically controlled studies has been conducted demonstrating the reduction of distress, anxiety and pain through a selection of specific music in various treatment situations in anesthesia, surgery, dentistry, obstetrics, pediatrics, geriatrics, pain therapy and rehabilitation. Specific programs for receptive application as well as for enhancement of physical exercises have been designed to match various situations.

Effects of music are monitored through physiological (stress hormones, cardiovascular parameters, vegetative rhythm, etc.) clinical (drug consumption, etc.) and psychological parameters (doctor-patient-relationship, subjective treatment outcome, psychological tests, etc.).

Cost benefits (reduced drug consumption, shortened duration of hospital stay, doctor-patient-relationship) are evaluated. The use of specifically designed programs, which are composed, arranged, recorded, mixed and presented according to guidelines are elaborated from practical experiences as well as from the research findings. One such program helps to control the activity level and the degree of cooperation/compliance of patients during unpleasant treatment procedures. Other programs offer better self-control against pain, stress and sleep disorders.

Technical and methodological considerations: The methodology and the technical equipment used to apply music must meet the practical needs of every different situation.

In the treatment of chronic pain for instance only loudspeakers can be used, while in acute pain as in surgery earphones are most suitable. In chronic pain the music must be free of any guiding rhythmic structure, whereas in acute stress situations as well as in physical therapy rhythm must be pronounced.

The design of instruments used to enable or enhance physical exercises must be specifically adapted to the needs of the patients and to the goals of the intervention. In general, conducting Music in Sports studies, the standards of research in clinical applied studies have to be full filled, i.e. state-of-

the-art clinically controlled research designs with a solid statistical evaluation must be secured. This can be achieved at best through multidisciplinary research groups.

Future trends in Music in Sports and Music Therapy: In future "health providers" and "music providers" will interact much more than today. There as ones are many folds. Six important trends concerning basic future developments in society in addition to specific changes in health care philosophy can be observed and should be considered.

Socio demographic trends: There is a new but substantial, yet widely untapped general market potential in the demographic development in our societies all over the world: we are getting older: In North America and Europe there will be twice as many elderly people within the next thirty years, i.e. 35% of the population will be older than 60 years. In Germany 4,5 million people will be older than 80 years at that time. Already today 53% of our people die in a hospital. Every third surgical procedure is carried out with patients over 70 years old. At the same time the number of people with mental or physical disabilities will probably double during that period. Already today 20% of the American as well as of the European population need increasing health support, most of it dealing with prevention of disability and rehabilitation of disability. "Market strategies" for health care providers, musicians and the music products industry need a redefinition in so far as music can significantly help to preserve wellness, social function and health, which obviously is the core task for society in this century.

Socio-medical trends: (a) Everybody recognize that today's curative Sports has reached its limits: - therapeutically, as medical science has to realize that the availability of high-tec equipment is not congruent with better patient care in general - economically, as all health care systems in the world are running high financial deficits. As a consequence there is a fundamental paradigm shift from a high-tec biomedical approach towards a holistic, or better, a humane view of the patient. That has two major implications: firstly, Quality of Life is re-established as new /old central measure for health care. Secondly, the Art of Sports is making a comeback. (b) Another fundamental paradigm shift occurs in our medical agenda: the goals are redefined. Therapy of illness/disability is no longer number one priority. Prevention and rehabilitation are the main goals in today's healthcare politics. We had to learn that more health and more wellness for more people can be achieved and afforded only through more prevention and better rehabilitation. This fact is recognized nowadays in politics, this fact is increasingly taken into consideration by insurance companies and "health providers". (c) Earlier discharge from hospital and enforced out-patient treatment are distinct goals of health politics all over the world. (d) The medical and scientific communities all over the world are now ready to accept complementary therapies. (e) Music in Sports has a solid scientific, empirical and practical basis. (f) Music in Sports saves money, mainly through a reduction of treatment time and drug demand.

Predictions for the Millennium: The observations outlined above lead to certain predictions with regard to the interrelationship of music and health care. In health care research efforts will be directed at developing health support methods which are holistic and affordable. Music in Sports is one of these methods. In both, the health industry as well as in the music industry new product developments will be significantly affected by demographic changes and by research in education and healthcare within the next two decades. This gives the Art of Music a chance to underline substantially its importance in human life, not only as a part of leisure time activities or pure aesthetic experience, but as to preserve humanity itself where it is endangered: in illness, disability and aging.

Music in Sports Millennium Agenda: The next step to be taken is to set into action Music in Sports Agenda. Let the three major suggestions be: **Research & Development:** we should: develop/adjust appropriate methods, musical instruments and technologies for use in medical settings,

create appropriate music programs for use in medical settings. Practical applications we should support the implementation of existing and already successfully used programs, methods, technologies and instruments on a larger scale. **Education:** we should support the implementation of more postgraduate courses and Ph. D. programs in Music in Sports and Music Therapy. All three measures together will facilitate the worldwide implementation of music in prevention, therapy and rehabilitation, thus opening substantial new opportunities in healthcare and sports.

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