

# Science & art of body percussion: a review

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## ABSTRACT

Romero FJ. Science & Art of Body Percussion: A review. *J. Hum. Sport Exerc.* Vol.8, No. 2, pp. 442-457, 2013. The purpose of this paper is to provide a comprehensive review of Body Percussion from all areas, focusing on existing academic literature and the contribution of different authors. Existing ethnographic publications are reviewed, as are the links with traditional dances, musical pedagogy, neuroscientific aspects, handclapping songs, use in shows, the sound properties of body percussion and, most importantly, the main authors who have systematically structured and build the foundations of body percussion in a coherent manner and with new contributions.

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## INTRODUCTION

We know that more than forty thousand years ago man created cave art. In the same way, he made his first musical instruments, as can be seen in remains found at archaeological sites in Spain (Atapuerca) and Germany (Suabia). For this reason, it is logical to think that since the dawn of time, man has accompanied his songs and dances with a strong beating of his feet and clapping of his palms. Body percussion, therefore, probably possesses an anthropological, sociological and biological foundation dating back to prehistoric times.

Man, since prehistoric times, has always had music “at hand”. Therefore it is not unreasonable to suggest that man’s first musical instrument was the human body. While his shouts and whistling could translate the most basic of melodic ideas, his beats and slaps could mark out the rhythmic spontaneity of his movements.

In primitive ages and cultures, man expressed himself musically with the elements that nature gave him: voice for the melody, and the movement of his limbs, with varying degrees of sound, for the rhythm. The expression of his song was accentuated through the accompaniment of the rhythmical movement of his hands or feet.

Romero (2006a) wrote the first review article on body percussion, and not only focused on the most representative authors in the field, but also on the way in which every educator who used this discipline in a serious and formal manner wrote about it. Each of the authors wrote about body percussion in completely different ways, each one putting their own stamp on it by linking it either to forms of writing more commonly associated with classical percussion, with drums, or with didactic methods.

The aim of this article is to carry out a review of the use of body percussion, ranging from its ethnographical, historical and pedagogical foundations right up to the present day, in order to understand its current state as fully as possible through an analysis of everything published on the subject to date.

## WHAT IS BODY PERCUSSION?

Body percussion is the art of striking the body to produce various types of sounds for didactic, therapeutic, anthropological and social purposes. In both the world of musical traditions and the world of the performance, body percussion has had various roles, which can be classified into its uses, meanings and functions which are specific to each individual culture. It is important to point out that nowadays the media and social networks play an important role in promoting body percussion due to their high levels of visual and aesthetic content. That said, however, its applications are highly varied, which is why we can classify the publications up until now into thematic blocks.

## ETHNOGRAPHIC PUBLICATIONS

This body of investigation is more social and anthropological in character, and can be classified into two larger groups (Romero, 2011b):

- General sources. These come from travellers, chroniclers and missionaries who travelled between the various continents between the 16th and 19th centuries and in their writing allude to the use of body percussion.

- Specific sources. These are written by ethnologists, anthropologists and ethnomusicologists, mainly in the 20<sup>th</sup> and 21<sup>st</sup> centuries, in which they directly address body percussion within a specific context.

### General sources

The travellers and chroniclers wrote about everything they saw during their travels and offer us very interesting information about the use of body percussion, as can be seen, for instance, in the publications of Livingston (1857), Lander (1833), Jobson (1623), Park (1795), Abreu (1595), Torriani (1588), Frutuoso (1522), and many more. These authors write in detail about how the people they saw hit their bodies, how they danced, and in what circumstances in different cultures, from a tribal perspective (Romero, 2008a).

### Specific sources

Various publications exist in this category: some are more precise and dedicate an entire section to the topic, whilst others give mention in several paragraphs. Warner & Babatunde (1965) is a fundamental publication for an understanding of body percussion as a discipline. As a specific source, it was one of the first to explain the importance of the body in relation to musical culture from an ethnographic perspective. The first chapter of their book, "Musical Instruments of Africa", published in the 1960s, is titled "Body Percussion", and explains, at an ethnomusicological level, the importance of body percussion in tribal forms of learning. In the same way, Curtis (1920) can be mentioned, who dedicated specific paragraphs to the types of sounds which can be made with hands at a tribal level in Africa:

*"they are tinted with many tonal effects produced simply by hitting one hand with the other in different ways. Sometimes a hand is cupped in order to hit the other, emitting a low, thick sound; on other occasions, handclaps are given with open palms, with a dry, sharp sound. Such sonic contrasts and the gradations in tone and volume are launched into the air with such a unique sense of their dynamic values that the white listener is astounded by these forms of artistic expression (...). Surely, it seems as if all the possible combinations of rhythms, stress and tones, formed by such simple means, are turned into art this percussive orchestra formed of human hands".*

Other authors have dealt with body percussion in a more tangential fashion in their ethnomusicological works, as is the case in Sachs (1937), Blacking (1967), Jones & Lomax (1972), Kubik (1978), Tani (1983), Arom (1985), Schütz (1992) and Agudé (1999).

## HISTORICAL PUBLICATIONS RELATED TO DANCE

In times past, the link between music and movement in a tribal context was inseparable. This is why, even today, in Ghana it is common to hear the phrase "if you can talk you can sing, if you can walk you can dance". In Europe, during the Middle Ages, the Renaissance and especially in the Baroque period, music and dance were also inseparable because they were both synonyms of high culture and refined tastes. It is for this reason that during the Renaissance and Baroque periods, monarchs were always masters in the skills of dance. Furthermore, for the nobility, dance was an essential discipline in education, going by the famous rule *mens sana in corpore sano*, that stemmed from the trivium and quadrivium in Medieval times which during the Renaissance and Baroque periods was adopted into noble education, along with many other principles of the Classical era. The nobles wished to emulate the monarchs, and therefore copied their ways and customs. This is the reason why they took such pains to learn the necessary skills to participate actively in the theatrical festivities in the palace (in masked balls and parties), in which dance had another aim, that of emulating royalty and thus get ahead socially and economically.

There are many important studies of dance, such as those of Thoinot Arbeau, Fabritio Caroso and many more, who wrote about their knowledge of movement (Ruiz, 1999; Nicolás, 2010). According to these sources, it is important to stress that many dances, of all types, use body percussion, such as in Klatschwaltzer in Austria, the Esku dantza of the Basque Country (Spain), Schuplattern in southern Germany, Balls dels Moretons from Majorca, Flamenco from Spain, and many others in which the body is always present. All of this is collected together and explained systematically in Romero (2011a, 2011b, 2011c).

## **MUSICAL PEDAGOGY**

The first musical pedagogue who incorporated this musical pairing into the basic training of all musicians was J. Dalcroze (1865-1950). He spent several years in the north of Africa, specifically in Algeria, which gave him an ethnographic perspective with which to focus on rhythm and movement in the education of other countries. Dalcroze himself then began to use body percussion in a very basic way (through handclaps, slaps on the thighs and stamps) within his musical training. Nevertheless, it is important to stress that this was not his main interest.

His method is based on carrying out exercises which, by means of the muscular sensations created, allow for the interior perception of the sound, rhythm and form, to be created and made stronger. In this way, it is possible to correct and improve the hearing and playing of young musicians (Jaques-Dalcroze, 1965). Followers of Dalcroze's theory have brought in other movements, and thus broadened his methods (Brice, 2003). Examples include the contributions of Rodríguez & Del Bianco (2009), in education, and Merlau Ponty in philosophy, as detailed by Juntunen (2004), Pelinski (2005) and Lopez (2005).

Subsequently, C. Orff (a direct disciple of Dalcroze) developed the specific use of body percussion in musical training, creating particular activities in which he brought together the spoken word with body percussion. The basis of his method revolves around his three basic pillars of music, movement and language (Keetman & Orff, 1963). His followers have very skilfully developed all of his ideas, as clearly seen in Haselbach, Hartmann (2006), Goodkin (2002a, 2002b, 2004), López-Ibor, Harding, Perkiö and Maschat and many others. Orff method routinely used body percussion in their methodology (Carley, 1997).

## **SECONDARY DIDACTIC SOURCES**

Under this heading we include those publications, which are didactic in character, or of a more pedagogical musical nature, in which a section, chapter or articles has been dedicated to body percussion. Key examples include Storms (1995), Stroh (1997b), Traugh (2000a, 2000b), Della-Giustina et al. (2000), Roca (2000), Ratsch (2003), Joly & Zenker (2003), Florisbelo & Morales (2005), Klee (2006), Champion (2006), Metzger & Häublein (2007), De Cesaro (2007), Utrilla (2007), Reese (2007), McCarthy (2007), Moritz & Staffa (2008, 2011), Mason (2008), Terhag (2009), Cremades (2009), Filz (2008, 2009), Zar (2011) and Grillo (2011).

## **NEUROLOGICAL ASPECTS**

From a neurological perspective, many authors have carried out specific studies on rhythm, motor control and music, making use of short patterns of body percussion (Hafke, 1996; Altenmüller et al, 2006; Thaut,

2008 and Lyle, 2009). In the same way, it is important to mention the works of Zatorre, Peretz and Trainor, who contribute specific findings to the field.

## **BODY PERCUSSION & HANDCLAPPING SONGS**

The clear link between body percussion and so-called 'handclapping songs' is of utmost importance, and thus a discussion cannot be omitted (Romero, 2012e). Many authors' concerns have focused on investigation into them, and offered up information in various different fields. Thus we classify the lines of investigation into handclapping games into five main blocks:

- Ethnomusicological studies. These are studies carried out by ethnomusicologists in order to analyse their musical structure, their origins and transmission from one generation to the next, and from rural to urban environments (Nettl, 2004; Kartomi, 1980; Blacking, 1967).
- Compilation studies. These are aimed towards compiling and transcribing all the handclapping games and other children's handclap games which are used in childhood coordination games (Hemsey de Gainza, 1996; Martín & Carbajo (2002, 2010).
- Didactic studies. These are focused on studying the application of handclaps from an educational perspective, both within and outside the classroom (Harwood, 1992, 1993, 1998; Riddel, 1990; Marsh, 1995, 2008; Obuo, 1996; Martín, 1997).
- Scientific neurological studies. These studies look at the stimulation of physical, cognitive and mental abilities of children, focusing on how they influence their psychomotor, psychological, social and cognitive development (Sheehan, 1998; Thaut, 2008; Kesslerling et al. 2006; Brodsky & Sulkin, 2003, 2005, 2007, 2011).
- Therapeutic studies. These are works that were carried out in order to stimulate, through sound and movement by means of body percussion, the development of communication skills, of body language and inclusive work skills in various illnesses, such as Parkinson's, Alzheimer's, Down's Syndrome, dyscalculia, and autism, amongst others. (Thaut, 2008; Romero, 2012a, 2012e).

## **MUSICAL COMPANIES**

It is in the world of performance and shows that body percussion has seen most development. In the world of academia, theories about theatre dominate instead. It is important to mention the role of Stomp, with its DVDs (1998, 2002, 2008) and the host of other companies which also make use of body percussion such as Mayumana, Camut Band, and especially Barbatuques (2007a, 2007b, 2007c). This company performs a simply brilliant repertoire in which they combine Brazilian rhythms with the sonic capabilities of the body.

## **MUSICAL WORKS**

The interest in body percussion has also reached composers in the world of classical music, notably the compositions of Steve Reich in his work Clapping, of Vinko Globokar in Corporel and in Oscar Navarro's work Libertadores.

## **BODY PERCUSSION FROM AN ACOUSTIC PERSPECTIVE**

The sounds that can be produced by the body have also been studied from an acoustic point of view, for example in the publications of Repp (1987), Neda et al. (2000), Chaudhuri et al. (2005) and Bouenard et al. (2012).

## BODY PERCUSSION IN CHIMPANZEES AND GORILLAS

The use of slaps and the beating of the chest by chimpanzees and gorillas has been much studied from the point of view of animal behaviour. Some authors show that in certain cases they use it to assert their territorial boundaries, which can be seen in the publications of Lyle et al. (2009), Fay (1989), Koops (2006), Fletcher (2006) and Kalan (2009) amongst others.

## SPECIFIC AUTHORS

There are many different authors who have made a personal contribution to body percussion, but none have made a played a greater and more unequivocal role than the American Keith Terry (1984, 2002, 2007). In his own unique and personal style, he has been able to express his ideas through courses and seminars at an international level, where body percussion has come to be conceived as a single discipline, linked to pedagogy and the world of performance. His methodology, laid out only in his DVDs, is principally structured according to the sections Technique, Rhythm blocks, Polymeters, Time Step, Phasing and Polyrhythms (2002). All we do body percussion feel indebted to Keith Terry for his important work. Other authors have contributed with their own personal perspectives and with varying areas of focus, notably the publications of Flatischler (1989, 2007), Uhde (1991), Ulrich (1997), Stroh (1997a), Reiter (1998, 2012), Zimmerman (1999), Yamada (2000), Romero (2001, 2004, 2006a, 2006b, 2008a, 2008b, 2008c, 2008d, 2011a, 2011b, 2011c, 2011d, 2011e, 2011f, 2011g, 2012a, 2012b, 2012c, 2012d, 2012e, 2013a, 2013b, 2013c, 2013d), Kaplan (2002), Heath & Leith (2006), Conrado & Padovano (2006), Burrows (2007), Wöhrlin (2008), Jasper (2009), Grosjean (2011a, 2011b, 2011c), Sydow & Petzold (2010), Filz (2011), Padovano (2011) and Schneider (2012).

All of these authors put forward arguments which are strictly related to rhythmic structures linked to coordination (Pedro Consorte), avoiding related aspects such as the classification of activities by age (nursery, primary and secondary), laterality, crossed laterality, attention (focal, sustained, selective, divided and alternating), neurological aspects, musically dated and studied ethnographical aspects, therapeutic aspects used in the treatment of Parkinson's, Alzheimer's and for neurorehabilitation, etc.

Romero Naranjo's argument (2011a, 2011b, 2011c) moves away from the strict patterns of coordination, linking them to methodology based on Gardner's Theory of Multiple Intelligences (1983). The result of that is that he is the first in the world to teach it academically, at the University of Alicante with the name "Body percussion and multiple intelligences", as part of the Masters in Secondary Education and Research course, with a duration of 125 hours.

## THE BAPNE METHOD

The aim of the BAPNE method is to develop the multiple intelligences through body percussion, supported by the five disciplines of biomechanics, anatomy, psychology, neuroscience and ethnomusicology. Each one of these disciplines establishes concrete parameters which help to give a systematic structure to the theoretical and practical activities, and together form the acronym BAPNE. Biomechanics helps us to understand how the human body moves in space, along planes and axes; anatomy shows us the exact movements of the bone structure and specific muscles; psychology helps us to use movement from a therapeutic perspective (Romero, 2012b); and ethnomusicology helps us to understand how the body moves in different cultures, and how the patterns differ between different cultures and continents (Romero, 2008). These five disciplines help us to give a systematic structure to the methodology. However, it is the

Multiple Intelligences that offer us the tools, techniques and aim of each activity, using the basis set out by Gardner (1983). Therefore, the methodological focus is along eight lines in order to develop the eight multiple intelligences: musical, bodily kinaesthetic, spatio-visual, interpersonal, intrapersonal, naturalist, linguistic and mathematical.

#### *The acronym BAPNE*

The BAPNE method is based on five disciplines (biomechanics, anatomy, psychology, neuroscience and ethnomusicology) which help us to base its use on the sciences of physical education. It is for this reason that we suggest its use as a basic resource within the framework of bodily expression, so that the body itself is presented and recognised as a basic sound element. When considering this aspect, it is essential to stress that it is the first musical instrument from which we can obtain an infinite range of practical resources, through beats, slaps and verbal sounds which force the subject to have organisational skills and to master movement (Nicolás, 2010), both individually and in a group.

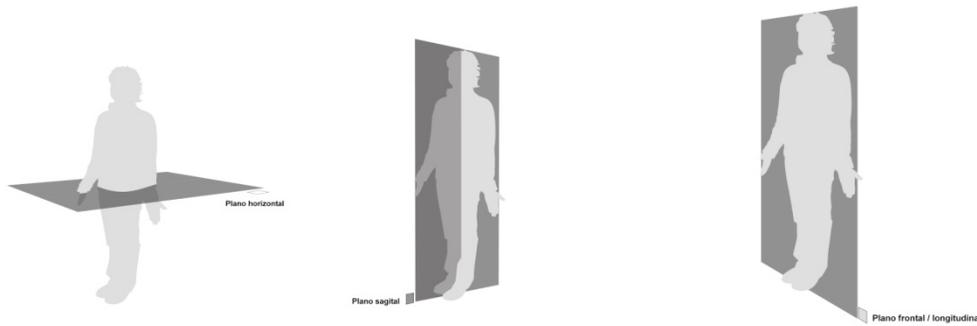
The student perceives, encourages and understands many of the aims of the subject matter of bodily expression through the BAPNE method, because they always have in mind that the perception of their body, as a producer of movements and sounds carried out in relation to rhythmic patterns, brings with it the concept of internal listening. The correct stimulation, in which the body feels, perceives and understands, is vital in order to understand the rhythmic possibilities and movements in space in the correct way.

This stimulation can be carried out through visual, auditory and kinaesthetic stimuli (as per the VAK model) which make the individual understand that “sound and movement” are an inseparable pairing. The understanding, knowledge and application of the structural principles of body percussion allow the individual to perceive and assimilate concrete aspects such as coordination, disassociation, laterality, attention and non-verbal communication through the body, as well as being able to create their own material on the basis of the material learnt. As Confucius famously stated, “give me a fish and I will eat for today, teach me to fish and I will eat for a lifetime”.

By means of these five disciplines, what is proposed is that the use of movement through body percussion and its expression will be of clear educational use, linked to better overall coordination for the individual, in all ways. For this reason, these five sections are the basis to understand a “Grammar of body percussion”.

#### *Biomechanics*

Biomechanics has a very important role in body percussion because it allows us to structure our exercises from a motor perspective. This discipline aims to study the mechanical structures that exist in living things. Both in the science of physical education as well as ballet, biomechanics is a compulsory discipline, and one that is indispensable during the training stage. For that reason, in the BAPNE method, we use the different planes and axes as a basis for the structure of our activities (Romero, 2012). This means that the coordination exercises are specifically classified with relation to each biomechanical plane and axis, helping the student’s level of attention not to slip, working in a focused, sustained, selective way (Romero, 2013b).



**Figure 1.** Biomechanical plane and axis

The instructor should be able to observe and analyse the consequential nature of the activities and the difficulties which are generated whilst working along biomechanical planes so that their class is able to string together movements and gestures both individually and in a group. In this way, the instructor will always be able to adapt and select those activities which are best suited to the sound stimulus and the class's individual skills.

### *Anatomy*

The anatomy of movement is vital because we must know what is going on at a bone and muscular level what is going on during the activities. Thus, in the BAPNE method, we work on specific exercises in order to strengthen specific parts of our organism. These are studied by means of electromyography (EMG), and other techniques, in order to evaluate and track the electric activity produced by the skeletal muscles.

The analysis and study of the muscles and bones used in the specific activities brings with them a detailed overview which has benefits in various areas of sport. It can improve reflexes, attention, and reaction to all manner of stimuli.

### *Psychology*

Body percussion as a therapeutic resource is one of the most important aims of the BAPNE method. With a psychological backing, body percussion within music and movement has a very valuable therapeutic foundation, helping patients with Parkinson's, Alzheimer's, brain damage, ADHD, dyslexia, movement disorders, autism, sight issues, depression and many other illnesses. Through specific exercises that are carefully directed towards each illness, the patient can be stimulated so as to offer them a better quality of life, both at a psychomotor and cognitive level (Romero, 2011f, 2011g, 2012a).

The ability to work in a group or community, to play and sing in unison, to play music on one another, to look at one another, and work in a non-hierarchical way and to feel supported by a group of classmates, all go towards reinforcing many therapeutic aspects which can be modified in relation to each particular illness.

### *Neuroscience*

From a neuroscientific perspective, important investigators such as Altenmüller (2006), Thaut (2004) and Fujioka (2012) have shown the importance of rhythm and a neurological level. In the BAPNE method, we explain all the activities from this perspective to that each one has a clear justification both at a didactic and therapeutic level. The associative motor cortex and the motor cingulate cortex have been identified as brain areas dedicated to bimanual rhythmic coordination. However, the level and nature of activity relocates to

other brain areas depending on the demands of the exercise, i.e. if they demand movement in space, talking, speaking, or interacting with other people. Therefore, an understanding of what is going on in our brain whilst we carry out the activities is fundamental at a didactic level, as is a knowledge of why certain activities are easier for some people than others.

### *Ethnomusicology*

Body percussion has a clear link to musical traditions across the continents. As a form of musical expression, it forms part of the cultural identity of the peoples of the Earth (Stroh, 1997a; 1997b). Through the BAPNE method, we offer an explanation to the uses, meanings and functions of body percussion through ethnomusicology (Romero, 2008, 2013a, 2013d).

## **WHY BODY PERCUSSION AND MULTIPLE INTELLIGENCES?**

The way in which the activities in the BAPNE method are structured comes under the scope of the multiples intelligences of Gardner (1983). The activities are presented from eight different perspectives, in order to stimulate each multiple intelligence (Romero, 2013c).

Within the cognitive theories on intelligence, Howard Gardner's proposal (1983) to consider it as a collection of mental abilities which are related to one another with a neuroscientific basis, aroused the interest of specialists in the field of education. Gardner's vision was completely new because it defined intelligence as a semi-autonomous system of information processing that manifested itself in the ability to solve problems or create new products that were important for a culture. According to Gardner, all people have the eight multiple intelligences, but differ in the amount and use of each of them, because they show strong points in one or several intelligences and weak points in others (Romero, 2012d).

The BAPNE method organizes its activities within the scope of multiple intelligences for various different reasons:

1. The empirical support based in neurology, neuroscience and the psychometric perspective
2. The results obtained in the intelligence evaluation tests that support teaching based on the multiple intelligences (Gardner, 1983) as opposed to Jensen's general intelligence factor.
3. The identification of strong and weak points in students and the adaptation of the teaching content.
4. For the five basic implications for teaching it in the classroom:
  - 4.1. Making education individual to the students.
  - 4.2. Teaching the content of subjects in different ways.
  - 4.3. Project-based learning.
  - 4.4. Curriculum based in art.
  - 4.5. Using evaluation within the context with teaching aims.

In this way, we try to explain all the activities set out in the BAPNE method in the most precise way possible, according to each one of the educational sectors and therapeutic uses, because, as Noam Chomsky says, "teaching is not like filling a cup with water, but more like enabling a flower to grow in its own way".

## **CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH**

Collaborative investigation between various different disciplines is the best way to help the academic development of body percussion. We all know that the choreography and spectacle of this discipline draw a

great deal of attention. However, we must widen our focus of attention toward aspects which can be seriously and strictly analysed. The body is much more than merely its role in percussion and the role of the body and its sound and psychomotor abilities.

As we have seen, body percussion covers a wide range of investigation, although it continues to lack a wealth of documented study. From an anthropological and ethnomusicological perspective, it is not just a question of watching, recording and bringing the uses of body percussion to the classroom; it is a question of deepening our understanding of it by carrying out field work, getting to know its development, the ways in which it can be transmitted, modifying its melodic and kinetic structures, discovering the different versions in existence, understanding gender roles, and many other aspects. In this way, we should not ignore children's coordination games and handclapping songs, a never-ending source of popular knowledge which should be tapped and taught in schools by teachers, as happens in many countries, such is the case in Cuba and Indonesia, and many other countries.

From a therapeutic perspective, body percussion is of unquestionable value. Its use in the field of investigation should be developed very specifically. Its therapeutic uses for depression, Alzheimer's, attention deficit hyperactivity disorder, dyslexia and many other illnesses suggest very promising results. This aspect is linked to the field of neurology which, thanks to the collaboration of neurologists, neuropsychologists, psychiatrists and doctors, allows us to contribute a great deal. From the BAPNE method, through investigation, much is being invested in this aspect, because it is a very important route to develop.

In the field of early education, mainly in the 3-6 age group, specific studies are needed to structure and support the use of body percussion in a clearly explained and justified way. For this reason, specific exercises are needed for this age group, which are both highly feasible and practical, because this is one of the areas most in demand by teachers.

Sports science is one of the disciplines which pay most attention to the evolution of body percussion and its use in teaching. For this reason, studies with accelerometers, heart rate monitors, electromyography, dynamography, cinematography, and studies involving electrogoniometry and pressuometry, are needed. It is hoped that this short section will encourage new lines of investigation into body percussion.

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