



Sports Injuries and Physiotherapy Services on Minimal Impairment in Indonesian Paralympic Athletes in The Asean Para Games Cambodia 2023

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Abstract

ASEAN Para Games is the largest disability sports competition in Southeast Asia. It is routinely held every two years. This study aims to identify sports injuries and physiotherapy services for minimal impairment in Indonesian Paralympic athletes during the ASEAN Para Games Cambodia 2023. The method was a retrospective descriptive epidemiological study with a cross-sectional approach and secondary data from NPC Indonesia. The population came from Indonesian Paralympic athletes who participated in the 2023 ASEAN Para Games, a total of 268 people. At the same time, the sample used was 174 athletes who suffered injuries and received physiotherapy services. Qualitative frequency analysis showed that limb deficiency was the most common impairment receiving physiotherapy services (42.5%, n=74). Of the 12 sports, Para Athletic was the most common sport in which physiotherapy services were received (77%, n=57). The knee and shoulder regions were the most commonly injured (20.6%, n=36). The massage gun was the most common physiotherapy modality, used 70 times out of a total of 1,498 times for all modalities. Services at the medical center clinic had the most follow-up status with 42 people, and receiving services in the field had the most resolved status with 61 people. This study provides valuable insights into injury patterns, medical admissions, and physiotherapy services during the ASEAN Para Games Cambodia 2023, besides highlighting the importance of tailored physiotherapy interventions in supporting the recovery of athletes during major Para sports events.



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INTRODUCTION

The ASEAN Para Games is the largest disability sports competition in Southeast Asia and is held routinely every two years. The 2023 ASEAN Para Games will be held in Phnom Penh, Cambodia, from June 3-9, 2023. The Indonesian ASEAN Para Games Organizing Committee (INASPOC) is an institution that coordinates all activities of the Indonesian contingent in the event. Meanwhile, the preparation of the athletes will be coordinated by the Indonesian National Paralympic Committee (NPC) (Ministry of Youth and Sport Republic of Indonesia, 2023; Mardiyanto & Okfitasari, 2023).

According to NPC Indonesia, Indonesia sent 268 athletes to compete in the ASEAN Para Games 2023. It consists of 12 sports, namely Blind Chess, Blind Judo, Boccia, CP Football, Goalball, Para Athletics, Para Badminton, Para Powerlifting, Para Swimming, Para Table Tennis, Sitting Volleyball, and WH Basketball. The medical staff comprises physiotherapists, physical medicine and rehabilitation specialists, and sports masseurs (Ministry of Youth and Sport Republic of Indonesia, 2023).

Injury is an unavoidable consequence for athletes. The prevalence of injury among paralympic athletes at international sporting events is approximately 10-12.8/1000 athletes. Sports injuries can affect psychosocial conditions, as seen in athletes' extrinsic and intrinsic motivation after injury (Bethapudi & Campbell, 2018; Deasyanti et al., 2021; Ibrahim et al., 2023).

In addition, Paralympic athletes' injuries affect performance during sport and can increase the severity of pre-existing disabilities, which obviously affects the athlete's daily activities. For example, poor proprioception will increase injuries in athletes with poor

vision, lack of bone density, and neurological impairment (Fagher et al., 2021; Park et al., 2022).

Physiotherapist are among the health professionals who influence Paralympic athletes to identify minimal impairment in order to prevent and reduce injury risk conditions (Fagher et al., 2021; Weiler et al., 2021). The NPC Indonesia supports the data.

There is very little literature on the epidemiology of paralympic sports compared to non-paralympic sports. The few studies that address the incidence of injuries in paralympic athletes are also limited to populations from specific countries, a specific Paralympic event, or specific sports, such as para-badminton only (Kong & Yam, 2022; Vitasari et al., 2023).

This study aims to determine sports injuries and physiotherapy services for minimal impairment in Indonesian Paralympic athletes during the ASEAN Para Games Cambodia 2023. This article can be considered and recommended for developing the evidence-based practice of sports physiotherapy, especially the Paralympics.

METHODS

The method used is a retrospective descriptive epidemiological study. This study aims to analyze secondary data from NPC Indonesia to determine the epidemiology of disability types and physiotherapy services at the ASEAN Para Games 2023 Indonesian contingent. The Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta, has approved this research with a Letter of Ethical Feasibility No. 655/KEPK-FIK/XI/2024.

Participants

The population came from Indonesian Paralympic athletes who participated in the 2023 ASEAN Para Games, a total of 268 people. The research was conducted at the National Paralympic Committee (NPC) Indonesia Clinic. The NPC Indonesia Medical Committee will approve this research.

Sampling Procedures

Using a cross-sectional approach and secondary data from NPC Indonesia, the study used a sample of 174 athletes who suffered injuries and received physiotherapy services.

Materials and Apparatus

Sport Injury

A sports injury is a condition of loss or damage to body structure or function during sports training or competition that has been medically recognized by examination by a clinical professional.

Sports injuries may interfere with training or competition and may result in athletes requiring medical treatment (Joseph & Finch, 2017; Pienheiro et al., 2023). Later, the data will be categorized by region.

Physiotherapy Services

Physiotherapy itself is a form of health service aimed at individuals and groups to develop, maintain, and restore body movement and function throughout the lifespan through the use of manual handling, movement enhancement, equipment (physical, electrotherapeutic, and mechanical), functional training, and communication (Regulation of the Minister of Health of the Republic of Indonesia Number 65 of 2015 Concerning Physiotherapy Service Standards, 2015).

The following are the types of physiotherapy services and their explanations.

Table 1. Type of Physiotherapy service

No.	Service type	Description
1.	Myofascial release	a type of manual therapy technique that applies pressure to muscles and fascia, stretching the myofascial. It aims to restore optimal length, reduce pain, and improve function (Stewart-Richardson et al., 2024).
2.	Recovery pump	used after competition or training by providing passive compression supported by compression garments. It aims to stimulate the pumping effect on the muscles for faster recovery (O’Riordan et al., 2022).
3.	Stretching	it is a movement that uses internal or external forces to improve muscle flexibility and increase joint range of motion (Zvetkova et al., 2023).
4.	Massage gun	a therapeutic modality that uses vibration to reduce pain and increase flexibility and muscle strength (Sams et al., 2023).
5.	Ultrasound diathermy	one of the therapeutic modalities for musculoskeletal disorders and other soft tissue injuries using ultrasound waves (Kim et al., 2019).
6.	Electrotherapy	a therapeutic modality used to improve muscle mass, motor function, and physical activity in some neurological conditions (Gobbo et al., 2019).
7.	Shock wave therapy	one therapeutic modality is applying single impulse transient acoustic waves of 1-microsecond duration to different patient

No.	Service type	Description
		body regions. The pain is reduced and facilitated through mechanotransduction(Corte-Rodriguez et al., 2023).
8.	Cryotherapy	a form of therapy that involves immersing the whole body or certain parts in cold water. It is usually used to treat injuries and sports recovery (Kwiecien & McHugh, 2021).
9.	Sport massage	a type of massage given to athletes as part of the recovery process to help prevent fatigue after training or competing (Ardiyanto & Sumartiningsih, 2023).
10.	Kinesio taping	an elastic therapeutic cast with thin material and skin-like elastic properties. It aims to correct muscle function by increasing muscle strength, reducing pain, improving circulation, increasing stability, and correcting the direction of movement of the joints (Nayanti et al., 2020).
11.	Ethyl chloride spray	a topical anesthetic spray for sports injuries and muscle spasms (Pascali et al., 2019).

Minimal Impairment

A Paralympic athlete with a physical impairment must be eligible, which refers to the level of disability they have. Minimum impairment criteria must be met in order to qualify. The following

explains the minimum impairment defined by the IPC in the Athlete Classification Code (www.paralympic.org).

The following is an explanation of minimal impairment in para-athletes.

Table 2. Minimal impairment in para-athletes

No.	Minimal impairment	Description
1.	Ataxia	athletes with ataxia have uncoordinated movements caused by damage to the central nervous system (IPC, 2020).
2.	Athetosis	athletes with constant slow, unaware movements (IPC, 2020).
3.	Hypertonia	athletes with hypertonia experience increased muscle tension and reduced ability of muscles to stretch (IPC, 2020).
4.	Impaired muscle power	athletes with muscle strength disorders who have health conditions that reduce or eliminate their ability to contract muscles for movement that generates force (IPC, 2020).
5.	Impaired PROM	athletes with passive range of motion impairments who have limited passive movement in one or more joints (IPC, 2020).
6.	Intellectual impairment	athletes with intellectual functioning and adaptive behavior limitations that affect the conceptual, social, and practical adaptive skills needed for daily living (IPC, 2020).
7.	Leg length discrepancy	athletes with leg length discrepancies due to limb growth disorders or trauma (IPC, 2020).
8.	Limb deficiency	complete or partial absence of bone or joint resulting from trauma, disease, or congenital limb deficiency (IPC, 2020).
9.	Short stature	athletes with short stature have shorter upper and lower limb bones (IPC, 2020)..
10.	Vision impairment	athletes with visual impairment due to damage to eye structure (IPC, 2020).

Procedures

The NPC Indonesia Clinic manages physiotherapy services for Indonesian Paralympic athletes to prevent and rehabilitate recurrent and chronic sports injuries. Each service involves a multidisciplinary approach, where a physician first assesses athletes. Then, the physiotherapist provides therapy programs such as myofascial release, recovery pump, stretching, massage gun, ultrasound diathermy, electrotherapy, shock wave therapy, cryotherapy, sports massage, kinesio taping, and ethyl chloride spray.

Design or Data Analysis

Physiotherapist use forms to record the initial assessment of athletes. In addition, they use medical records to provide data on minimal impairment, injury, clinical diagnosis, and therapy delivery. This study uses secondary data from the NPC Indonesia clinic.

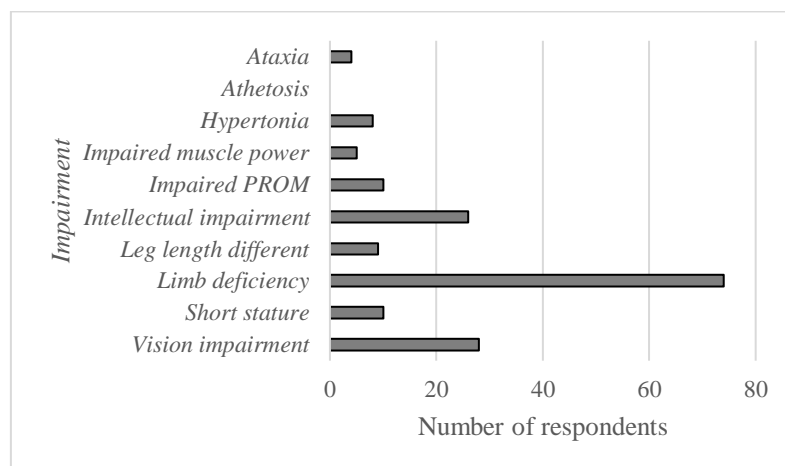
The data will be processed using descriptive statistical analysis and

categorized by region of injury, impairment, sport, and location of physiotherapy services.

RESULT

Characteristics of Injuries in Athletes Receiving Physiotherapy Services

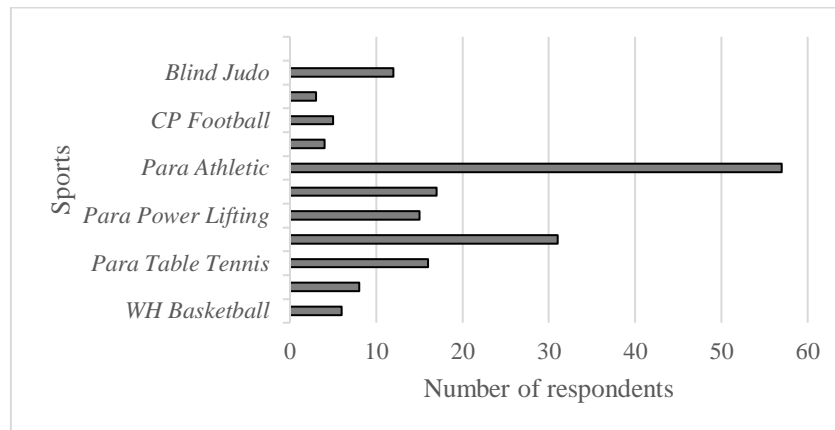
In the ASEAN Para Games in Cambodia 2023, it was reported that 174 athletes were injured and received physiotherapy services from 268 athletes. Based on the impairment category Graph 1 shows limb deficiency is the highest impairment that receives physiotherapy services with details of ataxia in as many as four people, athetosis 0 people, hypertonia in eight people, impaired muscle power in five people, impaired PROM in 10 people in, intellectual impairment 26 people, leg length different nine people, limb deficiency 74 people, short stature ten people, and visual impairment 28 people.



Graph 1. Number of respondents based on impairment

In the sports category (Graph 2) shows that the most athletes who receive physiotherapy services are Para athletic with details Blind chess 0 people, Blind judo 12 people, Boccia 3 people, CP football five people, Goalball 4 people,

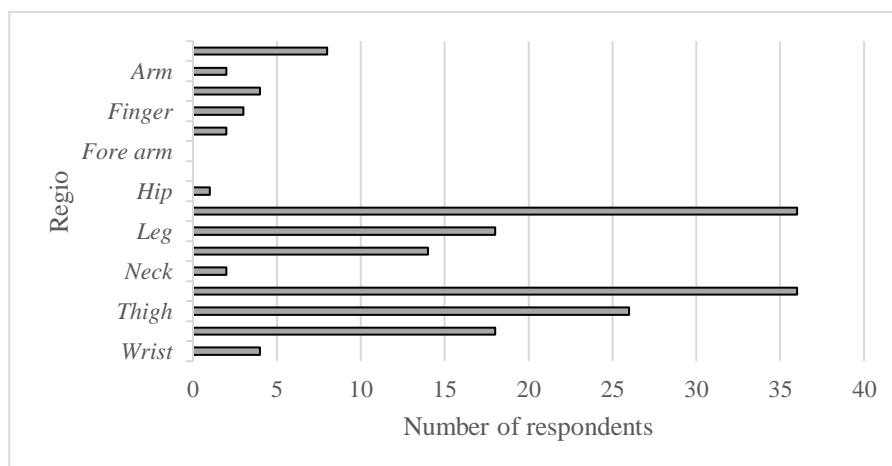
Para athletics 57 people, Para badminton 17 people, Para powerlifting 15 people, Para swimming 31 people, Para table tennis 16 people, Sitting volleyball eight people, and WH basketball six people.



Graph 2. Number of respondents based on sports

Furthermore, when viewed based on the injury region category (Graph 3) shows that the knee and shoulder regions have the highest value with details of the ankle region eight people, arm two people, elbow four people, finger three

people, foot 2 people, forearm 0 people, hand 0 people, hip one person, knee 18 people, leg 36 people, lower back 14 people, neck two people, shoulder 36 people, thigh 26 people, upper back 18 people, and wrist four people.



Graph3. Number of respondents based on the injury region

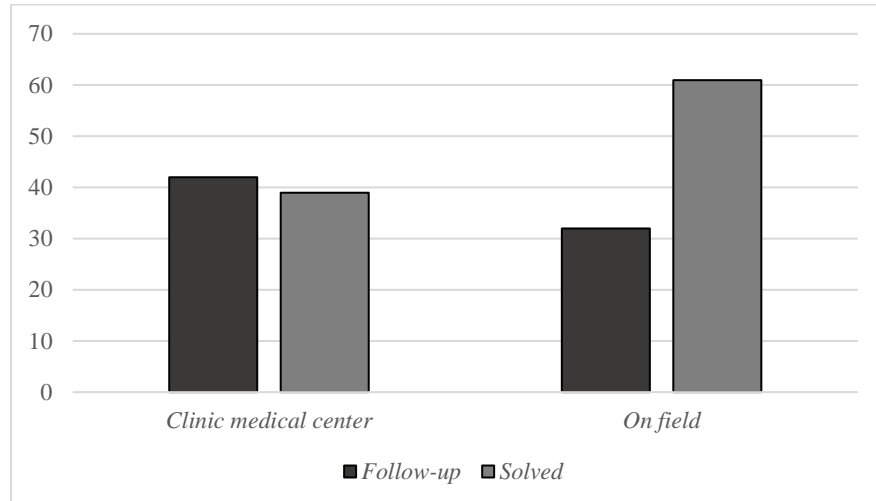
Physiotherapy Services

The physiotherapy services are divided into service locations, namely the medical center clinic and on the field with follow-up and resolved status. Based on Graph 4, 42 athletes receive services at the medical center clinic with follow-up status, 39 with solved status, 32 with follow-up status, and 61 with solved status.

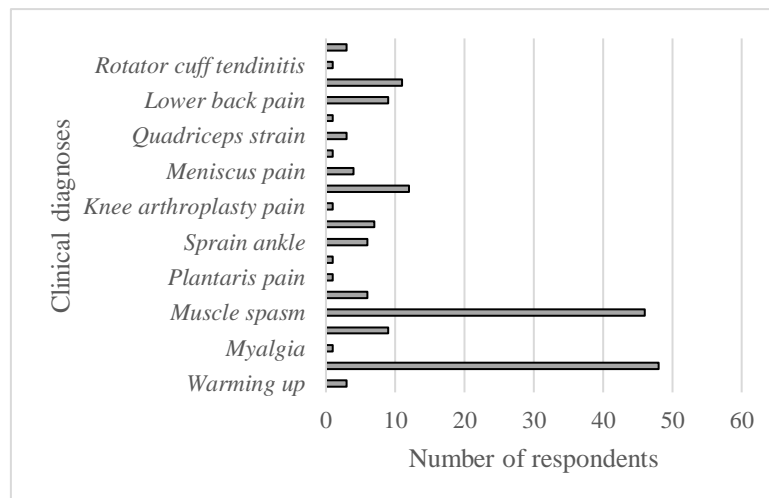
The most common clinical diagnosis in athletes receiving physiotherapy services is for recovery (Graph 5), with details of upper back pain in 3 people, rotator cuff tendinitis in 1 person, shoulder pain in 11 people, lower back pain in 9 people, hamstring strain in 1 person, quadriceps strain three people, meniscus tear one person, meniscus pain four people, knee pain 12

people, knee arthroplasty pain one person, Achilles tendinopathy seven people, ankle sprain six people, ankle instability one person, plantar pain one person, muscle fatigue six people,

muscle spasm 46 people, muscle tightness nine people, myalgia one person, recovery 48 people, and warming up three people.



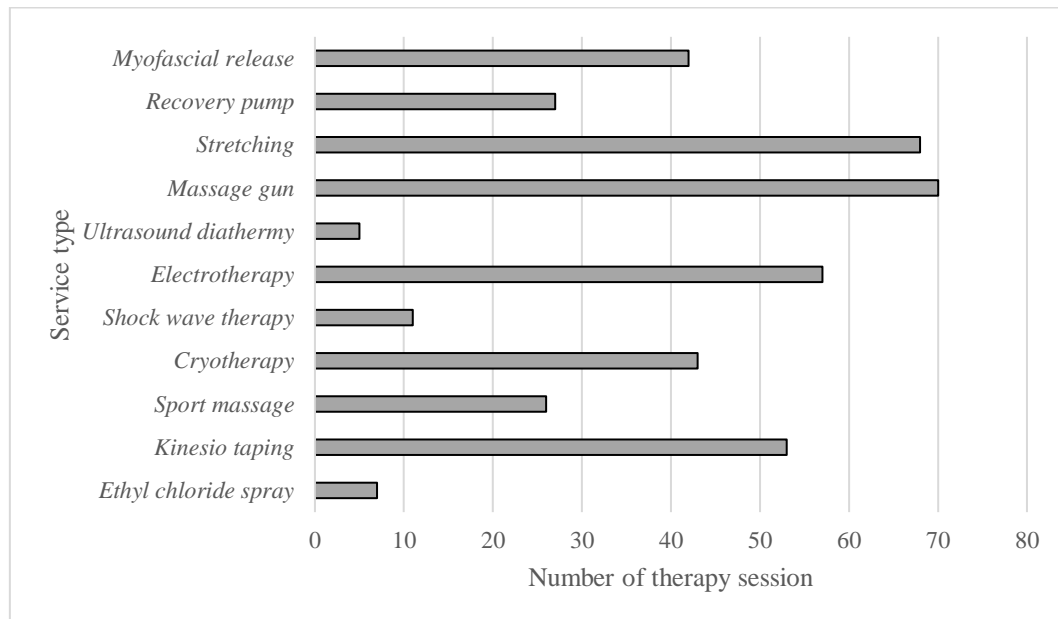
Graph 4. Number of respondents based on where physiotherapy services are provided



Graph 5. Number of respondents based on clinical diagnoses

In each therapy session, the athletes are given physiotherapy modalities. The most common physiotherapy modality administered was massage gun (Graph 6 with details of myofascial release 42 times, recovery pump 27 times, stretching 68 times, massage gun 70 times, ultrasound

diathermy 5 times, electrotherapy 57 times, shock wave therapy 11 times, cryotherapy 43 times, sports massage 26 times, kinesio taping 53 times, and ethyl chloride spray 7 times.



Graph 6. Number of respondents based on service type

DISCUSSION

This study aimed to report the incidence and characteristics of injuries, admissions, and physiotherapy services provided during the ASEAN Para Games Cambodia 2023.

Characteristics of Injuries in Athletes Receiving Physiotherapy Services

This study aimed to report the incidence and characteristics of injuries, admissions, and physiotherapy services provided during the ASEAN Para Games Cambodia 2023.

Characteristics of Injuries in Athletes Receiving Physiotherapy Services

Based on the results of qualitative frequency analysis, limb deficiency is the highest impairment that receives physiotherapy services with a percentage of 42.5%. Limb deficiency changes the body's biomechanics so that the intact limbs and trunk must use adaptive

mechanisms to compensate for the force of each movement. These adaptive mechanisms depend on the nature of the missing limb, physical health, mental health, and coping strategies. Therefore, paramedics need to understand these compensatory strategies to optimize services to athletes (Tinney et al., 2024; Willick, 2019).

There are 12 sports that Indonesia participates in, namely Blind Chess, Blind Judo, Boccia, CP Football, Goalball, Para Athletic, Para-Badminton, Para Powerlifting, Para Swimming, Para Table Tennis, Sitting Volley Ball 8 people, and WH Basketball. Para-athletics is the sport that receives the most physiotherapy services, with a percentage of 77%. Para-athletics is a basic sport based on the sector divided into track and field. The division of sports classes follows the World Para Athletics (WPA) classification rules by considering the characteristics of athletes to compete with the same skills athletes to compete with

the same skills (IPC, 2020; Kim & Hong, 2022). The knee and shoulder regions were the most commonly injured regions in the 2023 ASEAN Para Games, each with a percentage of 20.6%. These findings align with the research by Vitasari et al. (2023) which states that the upper extremity, especially the shoulder, is the most commonly injured anatomical region in Paralympic athletes. That may occur due to the important role of limb and knee control during sports (Kong & Yam, 2022; Räisänen et al., 2018).

Physiotherapy Services

The physiotherapy services provided are divided into service locations, namely the medical center clinic and on the field with follow-up and resolution status. If the injury is not treated immediately, it will cause prolonged pain, delaying the return to sports (Bayer et al., 2017). Therefore, it is necessary to use the right time to support the recovery process. The level of awareness among athletes is quite high, as the analysis results show that most clinical diagnoses in athletes receiving physiotherapy services are for recovery. Rehabilitation after injury can ensure full recovery and prevent recurrent injury (Dhillon et al., 2017; Purcell et al., 2019).

In each therapy session, the athletes will be given physiotherapy modalities. Massage Guns are the most common physiotherapy modality given during the ASEAN Para Games 2023. Massage Guns can help improve joint range of motion, flexibility, and recovery in the short term. They are usually applied to one muscle/muscle group in the hope that they will affect that area (Ferreira et al., 2023; Sams et al., 2023).

CONCLUSION

This study reports the incidence and characteristics of injuries,

admissions, and physiotherapy services provided during the ASEAN Para Games Cambodia 2023. Based on the results of qualitative frequency analysis on athletes who received physiotherapy services showed limb deficiency to be the highest impairment, para-athletics became the most sports, knee and shoulder regions became the most injured regions, recovery became the most clinical diagnosis, and massage gun became the most physiotherapy modality provided.

Services at the medical center clinic had the most follow-up status with 42 people, and receiving services in the field had the most resolved status with 61 people. This study's limitation is that it does not consider other factors such as gender, age, and medical history, nor does it subdivide injuries into acute and chronic. That may occur suggest further research.

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