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Dancing through life, an insight into the energy required by Fiyero Tigelaar

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Abstract

In the 2024 Film adaptation of *Wicked*, Fiyero Tigelaar's most well-known moment is when it comes to singing the song "Dancing Through Life". This paper looks into the practicality and possibility of being able to continue dancing through life. Looking at calorie intake against the number of calories being burnt due to the high levels of exercise, the article aims to explore the total amount of energy that Fiyero Tigelaar would require per day to pull off this feat.

Keywords: *Films; Biology; Biophysics; Energy; Calories; Dancing through life; Wicked: part I (2024)*

Introduction

In the 2024 movie *Wicked: part I* [1], Fiyero Tigelaar, played by Jonathan Bailey [2], is a prince who transfers to Shiz University about halfway through the school year as a result of being kicked out of his previous school due to the "carefree" lifestyle. Upon arrival at Shiz University, he begins to explain his carefree way of life through the song "Dancing Through Life" [3].

Within the song, Fiyero states that the easiest way to progress through life with minimal stress is to simply keep dancing to essentially numb your thoughts.



Figure 1 – Fiyero Tigelaar played by Jonathan Bailey in the 2024 recreation of *Wicked* [4].

In reality, when it comes to dancing through life, there are many effects that would occur on the body. In particular, the amount of energy and effort it would take to be able to pull this off, therefore the purpose of this article is to explore the amount of energy that would be required per day to be able to do this and look at the other long-term side effects that may come from this.

Assumptions

To be able to calculate the amount of energy required per day, there are a few parameters which need to be taken into consideration:

- An average of 7 hours of sleep is required per night [5].
- Due to the active nature of an average-height male, the recommended calorie intake of 2700 per day [6].
- All energy gained is being used to keep dancing.
- Jonathon Bailey weighs approximately 72 kg [7].

Methods

Calculating the basic energy requirement of Fiyero Tigelaar:

The basic energy requirement (BER) is the amount of energy that would be required in a day purely for resting and that is given by the equation [8]:

$$BER = 5.4 \times \text{Hours in a day} \times \text{Mass} \quad (eq^n 1)$$

Using Fiyero's mass (72 kg) and 24 hours in the day:

$$BER = 5.4 \times 24 \times 72 = 9330 \text{ kJ/day}$$

This is the minimum amount of energy required per day for Fiyero to survive.

Calculating the amount of energy used per day through dancing

Firstly, the amount of dancing which would occur per day is 17, due to the 7 hours required for sleeping. It is stated that the average number of calories burned per hour of dancing is $\approx 411 \times 10^3$ calories [9] using this we can calculate:

$$411 \times 10^3 \times 17 = 6987 \times 10^3 \text{ calories} \quad (eq^n 2)$$

Therefore 6987×10^3 calories are burned per day through dancing. Note that this is an average and doesn't specify how intense the dancing is.

We also know that $1 \text{ J} = 0.239$ calories [10]. Hence, we can calculate the daily amount of energy used through dancing to be:

$$\frac{6987 \times 10^3}{0.239} = 29,234 \text{ kJ} \quad (eq^n 3)$$

Taking into consideration that the recommended calorie intake per day for an active male is around 2700 calories, and the number of calories that would have been burned to be around 6987×10^3 calories. Fiyero would have to be consuming an excessive amount of high-energy food to be able to achieve this alone, never mind any of the further implications that could be caused.

Combining these values

The overall required energy per day, that Fiyero would need, can be calculated by combining the above two values:

$$\begin{aligned} \text{Total energy} &= \text{BER} + \text{Dancing energy} \quad (eq^n 4) \\ \text{Total energy} &= 9330 + 29,234 \\ \text{Total energy} &= 38,564 \text{ kJ/day} \end{aligned}$$

This is under the assumption that all the energy that Fiyero would require per day is in an ideal closed system where none is being transferred to the surroundings in the forms of heat or sound, etc. It also is under the assumption that the only energy which Fiyero uses is for dancing, and throughout the sleeping period.

How much energy is required throughout Fiyero's life

Excluding the additional day in leap years:

$$\begin{aligned} \text{Energy} &= 38,564 \times 365 \\ &= 14,075,860 \text{ kJ/year} \quad (eq^n 5) \end{aligned}$$

The average human is stated to live for approximately 82 years as of 2024 [11]. Therefore:

$$\begin{aligned} \text{Energy to be able to dance through life} \\ &= 14,075,860 \times 82 \\ &= 1,154,220,520 \text{ kJ} \quad (eq^n 6) \end{aligned}$$

This is equivalent to eating 3,111,107 bananas [12]. It is important to note that this value is an overestimate since it does not take into consideration that the amount of calorie intake and energy required changes as a human grows up.

Other impacts that will affect the body

Whilst dancing is a high energy-consuming sport, it also tends to be associated with a high level of injuries on the body. This risk is further amplified when dancing constantly throughout life.

Examples of this could include fractures in particular surrounding the knee and ankle joints [13]. Tendinopathy, which is common from overuse of the tendons, results in a reduction in movement over time [14]. In addition to exhaustion, which would occur from any longer periods of exercise, dancing constantly will leave no time for recovery.

Conclusion

As a result of the high levels of energy that would be required alone, and the fact that the values do not change with age or any other health conditions that may affect the rate at which Fiyero is dancing, this feat is essentially impossible.

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