2025 年度　東京都立大学大学院　人間健康科学研究科
博士前期課程　入学試験問題（冬季）理学療法科学域　筆記（専門）

問題 1. 以下の問いに答えなさい。

問1. 以下のデータは、ある研究対象者 10 名（A～J)の身長［cm］を測定した結果である。このデータの平均値、分散の値を求めなさい。

研究対象者	A	B	C	D	E	F	G	H	I	J
身長［cm］	172	165	181	178	168	175	162	173	163	184

問2. 下表はある整形外科テストの結果である。このテストの感度、特異度を求めなさい。

(名)

	疾患（＋)	疾患（－)	計
テスト陽性	36	64	100
テスト陰性	4	16	20
計	40	80	120

Question 1. Answer the following questions.

Q1. The following data shows the height [cm] of 10 research participants (A to J). Calculate these data's mean and variance.

research participants	A	B	C	D	E	F	G	H	I	J
height [cm]	172	165	181	178	168	175	162	173	163	184

Q2. The following table shows the results of an orthopedic examination. Calculate the sensitivity and specificity of this examination.

(person)

	disease (＋)	disease (－)	total
test positive	36	64	100
test negative	4	16	20
total	40	80	120

問題 2. 次の研究の要約を読み、以下の問いに答えなさい。

〔目的〕iPhone に標準搭載された傾斜計測アプリケーションの検者内・検者間信頼性を明らかにすることを目的とした。

〔対象と方法〕男性大学生 10 名 20 肢を被験者として、iPhone を用いた測定の経験がある者とない者で級内相関係数（ICC）を求めた。肩関節外旋・内旋可動域測定は、仰臥位、肩関節 90° 外転位・肘関節 90° 屈曲位、前腕中間位にて測定した。

〔結語〕iPhone を用いた肩関節回旋可動域測定は、高い信頼性があることが示唆された。

表 1　iPhone を用いた肩関節外旋および内旋関節可動域測定の検者内信頼性

		平均 ± 標準偏差	ICC（1,1）		ICC（1,2）	
			平均	95%信頼区間	平均	95%信頼区間
検者 A	外旋	120.0 ± 12.8	0.990	0.976-0.996	0.995	0.988-0.998
	内旋	60.8 ± 11.2	0.986	0.966-0.995	0.993	0.983-0.997
検者 B	外旋	120.1 ± 13.1	0.988	0.970-0.995	0.994	0.985-0.998
	内旋	62.5 ± 11.5	0.991	0.977-0.996	0.995	0.988-0.998

ICC：級内相関係数.

表 2　iPhone を用いた肩関節外旋および内旋関節可動域測定の検者間信頼性

		ICC（2,1）		ICC（2,2）	
		平均	95%信頼区間	平均	95%信頼区間
iPhone	外旋	0.897	0.758-0.958	0.946	0.863-0.979
	内旋	0.912	0.790-0.964	0.954	0.882-0.982

ICC：級内相関係数.

出典
西山侑汰, 国枝結花, 名頭薗亮太, 他. iPhone を用いた肩関節回旋可動域測定の検者内・検者間信頼性. 理学療法科学. 2023; 38(5): 361-364. https://doi.org/10.1589/rika.38.361
一部抜粋

問1. 検者 1 人がこの測定方法で肩関節回旋可動域を測定するとき、何回測定するのが妥当と考えるか。その理由も述べよ。ただし、ICC が 0.8 より大きいことが求められる。

問2. 複数の検者で、この測定方法での肩関節回旋可動域を測定するとき、何人で測定するのが妥当と考えるか。その理由も述べよ。ただし、ICC が 0.8 より大きいことが求められる。

Question 2. Read the following abstract and answer the following questions.

[Purpose] The purpose of this study was to clarify the intra- and inter-rater reliability of an iPhone measurement application.

[Participants and Methods] The subjects were 10 male university students, 20 arms, and the intraclass correlation coefficient (ICC) was calculated for those who did and did not use an iPhone for measurement. The range of motion of external and internal rotation of the shoulder joint was measured in the supine position with the shoulder joint in 90 degrees of external rotation, the elbow joint in 90 degrees of external rotation, and the forearm in the middle position.

[Conclusion] The iPhone-based shoulder rotation range-of-motion measurement was found to be highly reliable.

Table 1 Intra-rater reliability of shoulder joint external rotation and internal rotation range of motion measurement using an iPhone

		mean ± standard deviation	ICC (1,1) mean	ICC (1,1) 95% confidence interval	ICC (1,2) mean	ICC (1,2) 95% confidence interval
examiner A	external rotation	120.0 ± 12.8	0.990	0.976–0.996	0.995	0.988–0.998
	internal rotation	60.8 ± 11.2	0.986	0.966–0.995	0.993	0.983–0.997
examiner B	external rotation	120.1 ± 13.1	0.988	0.970–0.995	0.994	0.985–0.998
	internal rotation	62.5 ± 11.5	0.991	0.977–0.996	0.995	0.988–0.998

ICC : intraclass correlation coefficient

Table 1 Inter-rater reliability of shoulder joint external rotation and internal rotation range of motion measurement using an iPhone

		ICC (2,1) mean	ICC (2,1) 95% confidence interval	ICC (2,2) mean	ICC (2,2) 95% confidence interval
iPhone	external rotation	0.897	0.758–0.958	0.946	0.863–0.979
	internal rotation	0.912	0.790–0.964	0.954	0.882–0.982

ICC : intraclass correlation coefficient

Source of reference

Yuta NISHIYAMA, Yuika KUNIEDA, Ryota MYOTSUZONO, et al. Inter- and Intra-rater Reliability of Measurement of Range of Motion of the Shoulder Joint Using an iPhone. Rigakuryoho Kagaku. 2023; 38(5): 361-364.
https://doi.org/10.1589/rika.38.361
Partial excerpts, modified

Q1. How many times is it appropriate to measure the shoulder joint rotation range of motion using this measurement method with one examiner? Answer the number of times, including the reason. Note that it is required that the ICC be greater than 0.8.

Q2. How many examiners is it appropriate to measure shoulder joint rotational range of motion using this measurement method with multiple examiners? Answer the number of examiners, including the reason. Note that it is required that the ICC be greater than 0.8.

問題 3. 次の研究の要約を読み、以下の問いに答えなさい。

〔目的〕小学校高学年児童における modified Star Excursion Balance Test（mSEBT）*の信頼性を検討することを目的とした。

〔対象と方法〕健常な小学校高学年児童 9 名に mSEBT を 2 回連続で実施し、その際の検者内信頼性および Bland-Altman 分析（BAA)、誤差範囲を算出した。

〔結語〕小学校高学年児童において mSEBT の ICC は高値を示したが、測定の誤差は測定値から比較して許容できないほど高値となったため、小学校高学年児童に対する mSEBT は慎重に利用すべきである。

表 1　各測定方向における級内相関係数と Bland-Altman 分析

測定方向	1 回目 平均 [標準偏差]	2 回目 平均 [標準偏差]	ICC（1,1） [95% CI]	SEM (cm)	固定誤差 95% CI [p 値]	比例誤差 回帰直線の傾き [p 値]	誤差（cm） LOA [MDC_{95}]
前方リーチ	73.1 [17.7]	77.5 [18.0]	0.875 [0.703-0.951]	5.7	−8.43 to −0.45 [0.03]	−0.02 [0.86]	−13.3 to 4.4 [—]
同側後方リーチ	76.1 [14.1]	79.4 [12.9]	0.854 [0.657-0.942]	5.0	−7.95 to −0.94 [0.02]	0.11 [0.36]	−12.2 to 3.3 [—]
対側後方リーチ	65.0 [15.7]	69.4 [14.1]	0.797 [0.544-0.918]	5.8	−7.42 to 0.76 [0.10]	0.09 [0.56]	— [16.1]

ICC：intraclass correlation coefficient, CI：confidence interval, SEM：standard error of measurement, LOA：limits of agreement, MDC_{95}：95% confidence interval of minimal detectable change.

＊：modified Star Excursion Balance Test（mSEBT）は動的バランステストのひとつ。

出典
兎澤 良輔, 源 裕介, 浅田 菜穂, 他. 小学校高学年児童を対象とした modified Star Excursion Balance Test の信頼性の検討. 理学療法科学. 2021; 36(4): 543-546.　https://doi.org/10.1589/rika.36.543
一部抜粋

問1. 固定誤差を認めた測定方向をすべて答えなさい。

問2. 比例誤差を認めた測定方法の有無を答えなさい。有の場合はその測定方法を答えなさい。

Question 3. Read the following abstract and answer the following questions.

[Purpose] This study examined the reliability of the modified Star Excursion Balance Test (mSEBT) * for upper-grade elementary school children.

[Participants and Methods] The participants were nine healthy upper-grade elementary school children. The participants performed mSEBT twice in a row. Bland-Altman analysis was performed on the results, and the intra-rater reliability and error range were calculated.

[Conclusion] The ICC of mSEBT was high for upper-grade elementary school children. However, the error was unacceptably high compared with the measured values. Therefore, the mSEBT results of upper-grade elementary school children should be used with caution.

Table 1 Intraclass correlation coefficient and Bland-Altman analysis in each measurement direction

measurement direction	1st mean [standard deviation]	2nd mean [standard deviation]	ICC (1,1) [95% CI]	SEM (cm)	fixed error 95% CI [p-value]	proportional error slope of the regression line [p-value]	error (cm) LOA [MDC_{95}]
anterior reach	73.1 [17.7]	77.5 [18.0]	0.875 [0.703-0.951]	5.7	−8.43 to −0.45 [0.03]	−0.02 [0.86]	−13.3 to 4.4 [—]
ipsilateral posterior reach	76.1 [14.1]	79.4 [12.9]	0.854 [0.657-0.942]	5.0	−7.95 to −0.94 [0.02]	0.11 [0.36]	−12.2 to 3.3 [—]
contralateral posterior reach	65.0 [15.7]	69.4 [14.1]	0.797 [0.544-0.918]	5.8	−7.42 to 0.76 [0.10]	0.09 [0.56]	— [16.1]

ICC：intraclass correlation coefficient, CI：confidence interval, SEM：standard error of measurement, LOA：limits of agreement, MDC_{95}：95% confidence interval of minimal detectable change.

＊：The modified Star Excursion Balance Test (mSEBT) is a dynamic balance test.

Source of reference
Ryosuke TOZAWA, Yusuke MINAMOTO, Nao ASADA, et al. Reliability Examination of the Modified Star Excursion Balance Test for Upper-grade Elementary School Children. Rigakuryoho Kagaku. 2021; 36(4): 543-546.
https://doi.org/10.1589/rika.36.543
Partial excerpts, modified

Q1. Answer all measurement directions that have fixed errors.

Q2. Answer whether or not there is a measurement method that allows for proportional error. If there is, answer the measurement method.

問題 4. 次の研究の要約（英文）を読み、以下の問いに答えなさい。

Physical exercise for people with Parkinson's disease: a systematic review and network meta-analysis (Review)

Background

Physical exercise is effective in managing Parkinson's disease (PD), but the relative benefit of different exercise types remains unclear.

Objectives

To compare the effects of different types of physical exercise in adults with PD on the severity of motor signs, quality of life (QoL), and the occurrence of adverse events, and to generate a clinically meaningful treatment ranking using network meta-analyses (NMAs).

Search methods

An experienced information specialist performed a systematic search for relevant articles in CENTRAL, MEDLINE, Embase, and five other databases to 17 May 2021. We also searched trial registries, conference proceedings, and reference lists of identified studies up to this date.

Selection criteria

We included randomized controlled trials (RCTs) comparing one type of physical exercise for adults with PD to another type of exercise, a control group, or both.

Data collection and analysis

Two review authors independently extracted data. A third author was involved in case of disagreements.

We categorized the interventions and analyzed their effects on the severity of motor signs, QoL, freezing of gait, and functional mobility and balance up to six weeks after the intervention using NMAs. Two review authors independently

assessed the risk of bias using the risk of bias 2 (RoB 2) tool and rated the confidence in the evidence using the CINeMA approach for results on the severity of motor signs and QoL. We consulted a third review author to resolve any disagreements.

Due to heterogeneous reporting of adverse events, we summarized safety data narratively and rated our confidence in the evidence using the GRADE approach.

(This part is omitted)

Severity of motor signs

The evidence from the NMA suggests that dance and gait/balance/functional training probably have a moderate beneficial effect on the severity of motor signs, and multi-domain training probably has a small beneficial effect on the severity of motor signs. The evidence also suggests that endurance, aqua-based, strength/resistance, and mind-body training* might have a small beneficial effect on the severity of motor signs.

(This part is omitted)

Authors' conclusions

We found evidence of beneficial effects on the severity of motor signs and QoL for most types of physical exercise for people with PD included in this review, but little evidence of differences between these interventions. Thus, our review highlights the importance of physical exercise regarding our primary outcomes severity of motor signs and QoL, while the exact exercise type might be secondary. Notably, this conclusion is consistent with the possibility that specific motor symptoms may be treated most effectively by PD-specific programs. Although the evidence is very uncertain about the effect of exercise on the risk of adverse events, the interventions included in our review were described as relatively safe. Larger, well-conducted studies are needed to increase confidence in the evidence. Additional studies recruiting people with advanced disease severity and cognitive impairment

might help extend the generalizability of our findings to a broader range of people with PD.

*mind-body training: this term includes Tai-chi and Yoga, etc.

出典
Moritz Ernst, Ann-Kristin Folkerts, Romina Gollan, et al. Physical exercise for people with Parkinson's disease: a systematic review and network meta-analysis (Review), Cochrane Database of Systematic Reviews, Issue 4. Art. No.: CD013856, 2024
一部改変

問1. 本問題の文章はメタ分析の要約からの引用である。通常、メタ分析内で解析される論文は、どのような研究デザインのものであるか。以下の選択肢（a～d）から適切な記号を記入しなさい。

a. 記述的研究
b. 横断研究
c. 症例対照研究
d. 無作為化比較試験

問2. 介入効果を分析するために用いられたアウトカムを 5 つ挙げなさい。

問3. この論文は、複数の介入方法を含む研究を統合して解析するネットワークメタ分析である。介入方法（運動の種類）に依存した効果の違いがどのように示されたかを、問題文（英文）から抜粋して記述しなさい。

問4. 本論文の著者らは、“まとめ（Authors' conclusions）”において、さらに追加で必要な研究について言及している。その研究は、どのような研究であるべきか。著者らが述べたまとめに基づいて実現されるべき研究を想定し、その研究の目的を一つまたは二つの文章で述べ、PICO (P: Population / Patient, I: Intervention, C: Comparison, O: Outcome) を用いて端的に答えなさい。

Question 4. Read the following abstract and answer the following questions.

Physical exercise for people with Parkinson's disease: a systematic review and network meta-analysis (Review)

Background

Physical exercise is effective in managing Parkinson's disease (PD), but the relative benefit of different exercise types remains unclear.

Objectives

To compare the effects of different types of physical exercise in adults with PD on the severity of motor signs, quality of life (QoL), and the occurrence of adverse events, and to generate a clinically meaningful treatment ranking using network meta-analyses (NMAs).

Search methods

An experienced information specialist performed a systematic search for relevant articles in CENTRAL, MEDLINE, Embase, and five other databases to 17 May 2021. We also searched trial registries, conference proceedings, and reference lists of identified studies up to this date.

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The evidence from the NMA suggests that dance and gait/balance/functional training probably have a moderate beneficial effect on the severity of motor signs, and multi-domain training probably has a small beneficial effect on the severity of motor signs. The evidence also suggests that endurance, aqua-based, strength/resistance, and mind-body training* might have a small beneficial effect on the severity of motor signs.

(This part is omitted)

Authors' conclusions

We found evidence of beneficial effects on the severity of motor signs and QoL for most types of physical exercise for people with PD included in this review, but little evidence of differences between these interventions. Thus, our review highlights the importance of physical exercise regarding our primary outcomes severity of motor signs and QoL, while the exact exercise type might be secondary. Notably, this conclusion is consistent with the possibility that specific motor symptoms may be treated most effectively by PD-specific programs. Although the evidence is very uncertain about the effect of exercise on the risk of adverse events, the interventions included in our review were described as relatively safe. Larger, well-conducted studies are needed to increase confidence in the evidence. Additional studies recruiting people with advanced disease severity and cognitive impairment

might help extend the generalizability of our findings to a broader range of people with PD.

*mind-body training: this term includes Tai-chi and Yoga, etc.

Source of reference
Moritz Ernst, Ann-Kristin Folkerts, Romina Gollan, et al. Physical exercise for people with Parkinson's disease: a systematic review and network meta-analysis (Review), Cochrane Database of Systematic Reviews, Issue 4. Art. No.: CD013856, 2024
Partial excerpt

Q1. The text in this question is taken from a summary of a meta-analysis. What type of research design is usually analyzed in a meta-analysis? Please choose the appropriate symbol from the following options (a to d).

a. Descriptive research
b. Cross-sectional study
c. Case-control study
d. Randomized controlled trials

Q2. List five outcomes that were used to analyze the effects of the intervention in this study.

Q3. This article is a network meta-analysis. The studies extracted in network meta-analysis cover a wide range of intervention methods. Describe how the differences in the effects depending on the intervention method (type of exercise) are shown in this study, excerpted from the indicated summary of the article.

Q4. In the "Summary (Authors' conclusions)", the authors of this article mention additional research necessity. What kind of research should be done? Based on the summary given by the authors, assume that the research should be carried out, and state the purpose of the research in one or two sentences, using PICO (P: Population / Patient, I: Intervention, C: Comparison, O: Outcome) to answer simply.