Risk Assessment

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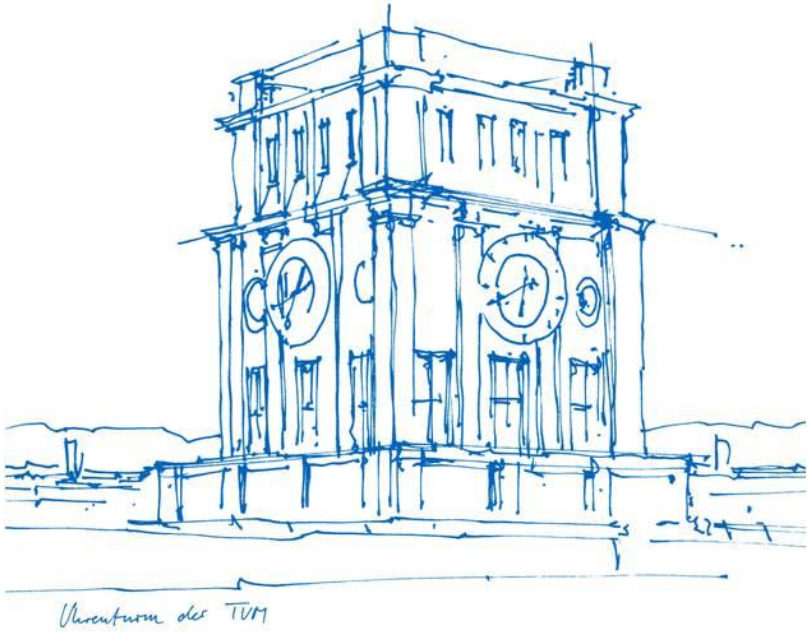

Assessement according to Risk-Matrix

Schadens-schwere / Eintritts-wahrschein-lichkeit	Keine gesund-heitlichen Folgen A	Bagatell-folgen (die Arbeit kann fortgesetzt werden) B	Mäßig schwere Folgen (Arbeitsaus-fall, ohne Dauer-schäden) C	Schwere Folgen (irreparable Dauer-schäden möglich) D	Tödliche Folgen E
fast unmöglich 1	extrem gering 1	extrem gering 1	sehr gering 2	eher gering 3	mittel 4
vorstellbar, aber unwahrscheinlich 2	extrem gering 1	sehr gering 2	eher gering 3	mittel 4	hoch 5
gelegentlich möglich 3	sehr gering 2	eher gering 3	mittel 4	hoch 5	sehr hoch 6
gut möglich 4	sehr gering 2	mittel 4	hoch 5	sehr hoch 6	extrem hoch 7
fast gewiss 5	sehr gering 2	mittel 4	sehr hoch 6	extrem hoch 7	extrem hoch 7

Topics

1. Cardiovascular Testing
2. Musco-sceletal testing (sportmotoric testing)

General Measures of Safety

- Labs and devices may only be used after certified introduction by qualified facility-staff. The introduction must be documented and signed!
- Please note and comply with the terms of use for each lab, which is provided at all entry-doors. Please also consider the safety instructions for devices in the Lab-Book or wall-attachments.

1. Cardiovascular testing

- ergometry
  a) treadmill
  b) cycle-ergometer
  c) Running track
- Spiroergometry
- Lactate

1. Cardiovascular testing - ergometry

	Risk-Factor	Applies? [green=yes, red=no]
01	Work-space managment, occupational safety	
02	Ergonomy and work-environment	
03	Mechanical Risk	only treadmill
04	Electrical Risk	
05	Physiological Risk	
06	Biological Risk	
07	Chemical Risk	
08	Risk of fire or explosion	
09	Physical Risk	
10	Psychological Risk	only treadmill
11	Requirements for special populations like adolescents, ongoing mother or breast-feeding mothers	

1. Cardiovascular testing - Ergometry

03 Mechanical Risk*: Risk of fall during running **(subject)**

Assessment in Risk-matrix: 5 (Severity of damage: E, Probability of occurance: 2)

Severity of damage *E: Fall during high belt-speeds with associated injuries, Risk of pinching at belt-induction*

Probability of occurance 2: Low during appropriate use. But possible due to stumbling etc.

Measures to minimize risk:

- **Mandatory introduction**
- **Mandatory use of safety-strap**
- **Integrated fall-stop automatic**

*only for treadmill

1. Cardiovascular testing - Ergometry

09 Physical risk: strain on the cardiovascular system **(subject)**

Assessment Risk-matrix: 5 (Severity of damage: E, Probability of occurance: 2)

Severity of damage *E: High cardiovascular strain can lead to heart attack in special cases.*

Probability of occurance 2: Possible in healthy subjects but unlikely.

Measures to minimize risk:

- **Mandatory attendance of first responder**
- **Viable defibrillator in laboratory**
- **Filled first aid box in laboratory**
- **Confirmation of ability to withstand stress of subject**
- **Control of heart frequency during testing when expecting >150 bpm**
- **Testings can by no means be conducted on your own (self-test)**

1. Cardiovascular testing - Ergometry

10 Psychological risk*: Compulsion during examination process **(subject)**

Assessment Risk-matrix: 2 (Severity of damage: B, Probability of occurance: 2)

Severity of damage *B: Obwohl der Proband den Test jederzeit selbst beenden kann, entsteht durch den Laufgurt und den Sicherheitsgurt ggf. ein beklemmendes Gefühl. Although subject can stop examination at any time point, an oppressive feeling could be developed because of a safety belt.*

Probability of occurance 2: Very rare that subject state this feeling and judge this as a problematic situation.

Measures to minimize risk:

- **Oral information of subject about safety measures**
- **Test abortion by subject at any time point**
- **Treadmill can be stopped by subject at any time point**

*concerns running tasks

1. Cardiovascular testing - Spirometry

	Risk-Factor	Applies? [green=yes, red=no]
01	Work-space managment, occupational safety	
02	Ergonomy and work-environment	
03	Mechanical Risk	
04	Electrical Risk	
05	Physiological Risk	
06	Biological Risk	
07	Chemical Risk	
08	Risk of fire or explosion	
09	Physical Risk	
10	Psychological Risk	
11	Requirements for special populations like adolescents, ongoing mother or breast-feeding mothers	

1. Cardiovascular testing - Spirometry

06 Biological risk: Risk of infection via respiratory system and contact with contaminated masks, flow sensor etc. **(subject)**

Assessment Risk-matrix: 3 (Severity of damage: C, Probability of occurence: 2)

Severity of damage C: viral or bacterial infection possible

Probability of occurence 2: Occurence is possible but unlikely

Measures to minimize risk:

- **Disinfection of mask and flow sensor after each subject**

1. Cardiovascular testing - Spirometry

09 Physical risk: Increased exhaling resistance can induce exercise-induced asthma and asthma attack **(Subject)**

Assessment **Risk-matrix: 3** (Severity of damage: C, Probability of occurence: 2)

Severity of damage *C: Occurence of asthma attack*

Probability of occurence: 2 *Occurence is possible but unlikely*

Measures to minimize risk:

- **Information about influence of wearing mask**
- **Requesting knowledge regarding exercise-induced asthma**

1. Cardiovascular testing - Spirometry

10 Psychological risk: Possible development of a feeling of anxiety **(subject)**

Assessment Risk-matrix: 2 (Severity of damage: B, Probability of occurence: 2)

Severity of damage B*: Slight impairment when wearing a mask*

Probability of occurence 2: *Very rarely stated as a relevant problem*

Measures to minimize risk:

- **Oral information of subject regarding safety measures and handling the mask**
- **Subject can abort spirometry at any time point and remove mask**

1. Cardiovascular testing - Lactate

	Risk-Factor	Applies? [green=yes, red=no]
01	Work-space managment, occupational safety	
02	Ergonomy and work-environment	
03	Mechanical Risk	
04	Electrical Risk	
05	Physiological Risk	
06	Biological Risk	
07	Chemical Risk	
08	Risk of fire or explosion	
09	Physical Risk	
10	Psychological Risk	
11	Requirements for special populations like adolescents, ongoing mother or breast-feeding mothers	

1. Cardiovascular testing - Lactate

06 Biological risk: Risk of infection (for the examiner and subject by minimal invasive capillary blood removal from ear lobe or finger pulp
(subject and examiner)

Assessment **Risk-matrix: 4** (Severity of damage: D, Probability of occurence: 2)

Severity of damage *D: Risk of infection via contagious diseases*

Probability of occurence *2: Unlikely infection because of capillary blood removal and usage of safety lancets*

Measures to minimize risk:

For examiner:
- **Wearing safety gloves**
- **Wearing safety glasses**

For subject:
- **Wearing safety gloves (by examiner)**
- **Usage of safety lancets**
- **Disinfection**

1. Cardiovascular testing - Lactate

09 Physiological Risk: Stab wound for capillary blood removal **(subject)**

Assessment Risk-matrix: 2 (Severity of damage: B, Probability of occurence: 2)

Severity of damage *B: Slight impairment by stab wound*

Probability of occurence *2: Very rare occurence of adverse effects by stab wound*

Measures to minimize risk:

- **Usage of safety lancet**

1. Cardiovascular testing - Lactate

Measures to minimize risk:

For examiner:

- **Wearing safety gloves**
- **Wearing safety glasses**
- **Disposal of lancets in ironclad bucket for destruction**
- **Disposal of contaminated blunt objects (swab, gloves etc.) in bag for destruction**
- **Bucket and bag for destruction get autoclaved on regular basis**

For subject:

- **Wearing safety gloves (by examiner)**
- **Usage of safety lancets**
- **Disinfection**

1. Cardiovascular testing - Lactate

10 Psychological risk: blood removal (very small sample) and stab wound can cause feeling of anxiety**(subject)**

Assessment Risk-matrix: 2 (Severity of damage: B, Probability of occurence: 2)

Severity of damage *B: Geringe Schäden können durch Angst vor Blutentnahme entstehen.*

Probability of occurence *2: Dieser Fall tritt nur äußerst selten ein*

Measures to minimize risk:

- **Oral information and further hint at voluntary participation**

1. Cardiovascular testing - Lactate

Description of procedure:

1. Preparation of utensils on clean cart
2. Putting on single-use gloves
3. Disinfect ear lobe or finger pulp of subject
4. Unlock safety lancet
5. Stab
6. Immediate disposal of lancte in ironclad bucket
7. Removal of 20µl capillary blood (rare: 100µl) via plastic-capillary
8. Immediate transfer of capillary in reaction tube OR content of capillary via pipet with immediate disposal of capillary in iron clad bucket
9. Disposal of potential conatminated blunt material in bag for destruction

2. Musculoskeletal testing

- Isokinetic force measurement
- Jump analysis
- Sprint ability

2. Musculoskeletal testing – Isokinetic force measurement

	Risk-Factor	Applies? [green=yes, red=no]
01	Work-space managment, occupational safety	
02	Ergonomy and work-environment	
03	Mechanical Risk	
04	Electrical Risk	
05	Physiological Risk	
06	Biological Risk	
07	Chemical Risk	
08	Risk of fire or explosion	
09	Physical Risk	
10	Psychological Risk	
11	Requirements for special populations like adolescents, ongoing mother or breast-feeding mothers	

2. Musculoskeletal testing – Isokinetic force measurement

03 Mechancial risk: Mismanagement of lever-arm. More range of motion of lever-arm than range of motion of participants joint (risk of hyperextension of knee during multi-joint movements) **(subject)**

Assessment **Risk-matrix: 4** (Severity of damage: D, Probability of occurence: 2)

Severity of damage *D: Severe physical harm (fractures, ruptures of extremities)*

Probability of occurence *2: Adequate handling prevents physical harm.*

2. Musculoskeletal testing – Isokinetic force measurement

Measures to minimize risk:

- **Comprehensive introduction for examiner**
- **Examiner is supposed to have reached master-level. Attending supervisor if bachelor candidate (rare)**
- **Mandatory placement of safety restrictions**
- **Usage of safety pads to avoid hyperextension of the knee**

2. Musculoskeletal testing – Isokinetic force measurement

03 Mechanical risk: lever-arm could cause injuries when not paying attention **(examiner)**

Assessment **Risk-matrix: 3** (Severity of damage: C, Probability of occurence: 2)

Severity of damage *C: Quetsch- und Stoßgefahr durch beweglichen, motorgetriebenen Hebelarm.*

Probability of occurence *2: Bei sachgemäßer Handhabung sind keine Schäden zu erwarten.*

Measures to minimize risk:

- **Hazard warning line to mark potential danger zone**

2. Musculoskeletal testing – Isokinetic force measurement

09 Physical risk: Muscle tear during maximal efforts **(subject)**

Assessment **Risk-matrix: 3** (Severity of damage: C, Probability of occurence: 2)
Severity of damage *C: High muscular strain cann cause muscle tears (especially when skipping warm-up)*

Probability of occurence *2: Unlikely when perfoming a warm-up prior to testing.*

Measures to minimize risk:

- **Participant performs a general warm-up on bike ergometer**
- **Participant performs local warm-up on dynamometer (movement which is then being tested)**

2. Musculoskeletal testing – Isokinetic force measurement

10 Psychological risk: Possibly causing temporary feelings of anxiety. It is necessary for standardization to fixate the subject on the dynamometer **(subject)**

Assessment Risk-matrix: 2 (Severity of damage: B, Probability of occurence: 2)
Severity of damage *B: Fixation of the subject on the dynamometer can cause temporary feelings of anxiety*

Probability of occurence *2: Very rarely participants report about relevant contraints*

Measures to minimize risk:

- **Oral information about safety measures and usage of safety belts**
- **Subject can abort testing and open saftey belts at any time**
- **Subject can press emergency button at any time point**

2. Musculoskeletal testing – Jump analysis

	Risk-Factor	Applies? [green=yes, red=no]
01	Work-space managment, occupational safety	
02	Ergonomy and work-environment	
03	Mechanical Risk	
04	Electrical Risk	
05	Physiological Risk	
06	Biological Risk	
07	Chemical Risk	
08	Risk of fire or explosion	
09	Physical Risk	
10	Psychological Risk	
11	Requirements for special populations like adolescents, ongoing mother or breast-feeding mothers	

2. Musculoskeletal testing – Jump analysis

09 Physical risk: Risk of injury during landing, e.g. rolling an ankle **(subject)**

Assessment **Risk-matrix: 3** (Severity of damage: C, Probability of occurence: 2)

Severity of damage *C: Possibility of fractures or ruptures when jumping, especially the ankle joint*

Probability of occurence *2: Unlikely when using appropriate shoes or jumping barefoot on flat surface*

Measures to minimize risk:

- **Subject performs a general warm-up**
- **Detailed explanation of correct execution of the jumping movement and testing procedure**
- **Subject performs submaximal jumps in preperation of testing**

2. Musculoskeletal testing – Sprint ability

	Risk-Factor	Applies? [green=yes, red=no]
01	Work-space managment, occupational safety	
02	Ergonomy and work-environment	
03	Mechanical Risk	
04	Electrical Risk	
05	Physiological Risk	
06	Biological Risk	
07	Chemical Risk	
08	Risk of fire or explosion	
09	Physical Risk	
10	Psychological Risk	
11	Requirements for special populations like adolescents, ongoing mother or breast-feeding mothers	

2. Musculoskeletal testing – Sprint ability

09 Physical risk: Increased muscular strain during maximal sprinting velocity can cause potential muscle tears **(subject)**

Assessment **Risk-matrix: 4** (Severity of damage: C, Probability of occurence: 3)
Severity of damage *C: Maximal sprinting can cause muscle tears*

Probability of occurence *3: Likely risk of injury without proper warm-up*

Measures to minimize risk:

- **Subject performy a general warm-up**
- **Detailed explanation of correct execution of the sprinting movement and testing procedure**
- **Subject performs acceleration runs prior to maximal effort sprints**