Equine e-Health:

Allflex ID Chip for temperature in Horses
E-Health

Fashion
- Humans
- Animals

Opportunity
- Data collection
  - Type
  - Number

Better Medicine
- Learn more
- Parameters analysis
- Prevention

jeudi 27 octobre 2016
E-Health Tools

Monitoring
- Small
- Wireless
- Easy to handle / use
- Ready to work any conditions
- Reliable
- Non or mini-invasive

Reader
- Small
- Easy to use
- Fast
- Recorder
E-Health Tools

Data collection
- Software
- Application

Data sharing system
- Internet
- Cloud
**Equine e-Health**

**Existing monitoring**
- HR: Polar
- Kms / Speed: GPS
- ECG: aliveCor
- ABP
- sPO2

**In development**
- Locomotor: gait analysis
- Position analyser: standing/lying
- Movement trackers
- ECG?
- Superficial temp?
**Equine Medicine**

**Equine Pathologies**
- Locomotor Problems
- Infectious Diseases
- Respiratory Problems
- Abdominal Pain (colic)
- Exercise Intolerance

**Equine Industry**
- Professional
  - Trainers
  - Vets
- Semi-professional
- Leisure
What we know

- Normal temperature = Good Health
- High = bad
- Low = very bad
- Normal = stable
- Range = 37.0 - 37.9°C
- Literature...!
What we don’t know

- Normal variations
  - Age / breed
  - Day variation
  - Activity
  - Transportation

- Individual variations

- Good interpretation
  - Increase / Decrease
    - Level
    - Time
  - Individual / group
    - Status
    - Prevention
Equine Temperature

Fever
- Diseases
  - Infection
  - Inflammation
- Pain
- Exercise
- Stress
- Malignant hyperthermia

Decreased temperature
- Shock / Distress
- Hypothermia
- General anesthesia
- Treatment
- Post-Exercise?
Equine Temperature

**Fever = first sign of**

- Infectious diseases
  - Influenza
  - Herpes virus
  - Strangles
  - Bacteriemia
  - Local / General

- Physiological Body Response
  - Inflammation / Pain
  - Metabolic response

**Signs of fever... but not first**

- Decreased appetite / anorexia
- Dullness / Head down
- Decreased movements
Rectal Temperature

- Actual Reference
- Dangerous
- Dirty
- Time consuming
  - Mini 1.30 min/ horse
  - 2 to 3 times a day
  - +- 2 persons!
- Technician dependant
  - Reliability?

Uses
- Check problems
- Problems follow up
- Individual vs group
- Rarely in prevention...
The aim of this study was to look if a reliable correlation between superficial skin and rectal temperatures exists, in order to evaluate a simpler, faster, economical and less dangerous method to follow body temperature in horses.
Rectal and superficial skin temperatures of 12 normal horses

6 SH, 3 STD, 3 THB were compared throughout 6 months (March-September 2014) and 1 year (March 2014-March 2015).

Temperatures were measured with:

- Digital thermometer (®Pelimex sa f67) for rectal values
- Infra red laser thermometer (®Voltcraft IR-380°) for superficial skin values
- Electronic inside/outside external thermometer (®Otio EM713P) for ambient temperature values.

For each horse, temperature measurements (°C) were taken in its box, every morning between 8.30 and 9.30 am. Every special conditions were recorded when needed (blanket retrieval, back from outside...).
Rectal temperature (TR) was recorded after a double check. Ambient temperature (TA) was recorded inside the box. Data from skin temperature were collected from 5 specific superficial areas of the horse:

- **TF** = frontal bone (head)
- **TC** = chest (pectoral muscles)
- **TNU** = upper left 1/3 rd of the neck (microchip position)
- **TNB** = left neck basis (IM injection site)
- **TH** = left heart position (6th left interscostal space, point of elbow)
486 records were collected during the period March 2014 to September 2014, and 1077 from March 2014 to March 2015, providing 3451 and 7539 temperature values.

All readings, except TR varied with TA but TNU and TF were the less influenced by ambient temperature and so the more correlated to TR. Calculated differences [TR-TF] and [TR-TNU] were the lowest ones, 11 + - 2,67 (10,3) and 9,73 + - 3,65 (8,9)°C respectively for the whole year.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Records</td>
<td>486 // 3451 values</td>
<td>1077 // 7539 values</td>
</tr>
<tr>
<td>TA</td>
<td>20,77°C +-0,37(22,6)</td>
<td>16,58°C +- 6,95(17)</td>
</tr>
<tr>
<td>TR</td>
<td>37,49 °C +-0,22 (37,5)</td>
<td>37,46°C +-0,28(37,4)</td>
</tr>
<tr>
<td>TF</td>
<td>28,58 °C +-0,68(27,9)</td>
<td>26,46°C +-2,69(27,3)</td>
</tr>
<tr>
<td>TC</td>
<td>31,22 °C +-0,51 (31,4)</td>
<td>31,39°C +-1,95(31,4)</td>
</tr>
<tr>
<td>TNU</td>
<td>30,53 °C +-1,18 (30,7)</td>
<td>27,69°C +-3,64(28,5)</td>
</tr>
<tr>
<td>TNB</td>
<td>31,01 °C +-0,54 (31,1)</td>
<td>28,74°C +-3,40(29,7)</td>
</tr>
<tr>
<td>TH</td>
<td>31,62 °C +-0,48 (31,7)</td>
<td>31,71°C+-2,05(31,7)</td>
</tr>
</tbody>
</table>
T° MEASUREMENT IN HORSES

Temperatures Evolution
"T° MEASUREMENT IN HORSES"

Régression de TR par TF ($R^2=0.020$)

Régression de TR par TNU ($R^2=0.000$)

- Actives
- Modèle
- Int. de conf. (Moyenne 95%)
- Int. de conf. (Obs. 95%)
\textbf{T° MEASUREMENT IN HORSES}

\textbf{CONCLUSION}

More data should be collected and interpreted in more specific conditions (outside extreme temperatures, sick horses with fever), but infra red superficial skin measurements in the neck (microchip site placement - left side upper neck) and head (frontal bone – like in men) should be considered as an easy and safe alternative to record horse’s body temperature in practice.
**Equine microchips**

**Identification of horses**
- European Horse’s book
- Stud books
- Description
- Drawings
- Drug traceability

**Microchips**
- Easy
- Unique
- Database
  - Cloud
  - Europe?
Equine Temp Chip

Temperature

- Inside monitoring
- Already in for ID
- Easy / safe / clean
- Ready

- Biothermo
- Reliability?
Equine Temp Chip

Reliability

- Latest version
- Needle length
- IM chip position
- Instructions
Equine Temp Chip

Chip Implantation

jeudi 27 octobre 2016
Equine Temp Chip Measurement

jeudi 27 octobre 2016
Equine Temp Chip

Reliability

- 4 horses
- 210 records
- Analysis
  - Horse / horse
  - All data

jeudi 27 octobre 2016
Reliability Horse / Horse

Clovis

Uno

jeudi 27 octobre 2016
Equine Temp Chip

Reliability all data

jeudi 27 octobre 2016

moy
37,640
37,776

sd
0,194
0,246

moy diff
-0,14

sd diff
0,227
Equine Temp Chip

Objectives
- Data collection
- Surveillance
- Education
- Learning

Expectations
- Increased level Equine Health
- Collaborative Health / Welfare
- Ex: Anesthesia monitoring
RISQUES EN ANESTHÉSIE ÉQUINE

ANAESTHETIC RELATED PROBLEMS

- less PoARP with time
- more PeARP with time
- more complicated surgeries with time

POST-ANAESTHETIC PROBLEMS

- 1 : myopathy
- 2 : neuropathy
- 3 : neurologic problem
- 4 : fracture in recovery
- 5 : caecal impaction

- less myopathy
- less fractures
Equine Temp Chip

Anesthesia Monitoring Experience

Humans

Scicluna Claire, 2000

Complications post-anesthésiques

AVEF, Strasbourg 2000

Monitoring et prévention

PROBLEME 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Oxymétrie pouls

Capnographie

Spiromètre

Sphygmomanomètre

Stéthoscope

Analyseur halogéné

Analyseur oxygène

ECG

Thermomètre

d’après Lake

1 - déconnection
2 - hypoventilation
3 - intubation oesophagienne
4 - intubation bronchique
5 - hypoxie circuit
6 - soudage halogéné
7 - hypovolémie
8 - pneumothorax
9 - embolisme air
10 - hyperthermie
11 - aspiration
12 - désordre acido-basique
13 - arythmie
14 - soudage intraveineux

Scicluna Claire, 2000

Complications post-anesthésiques

AVEF, Strasbourg 2000

Monitoring et prévention

PROBLEME 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Oxymétrie pouls

Capnographie

Pal

Gaz sanguins

Stéthoscope

Sonde réveil

Analyseur oxygène

ECG

Thermomètre

1 - myopathie
2 - neuropathie
3 - myélomalacie
4 - comportement
5 - iléus
6 - endotoxémie
7 - impaction caecum
8 - icère
9 - ulcères gastroïques
10 - pneumonie
11 - spasme larynx
12 - réveil rapide
13 - arythmie
14 - douleur

jeudi 27 octobre 2016
Equine Temp Chip

Tool for future

- Trainers
  - Training follow up
  - Treatment follow up
  - Prevention

- Owners
  - Prevention

- Vets
  - Diseases
  - Exercise intolerance / Prep
  - Anesthesia
  - Treatment / Drugs follow up
  - Clinical research
  - AM treatment stop
  - ....
  - Prevention & welfare