Development of a database of fetal ultrasound measurements for the creation of orangutan-specific (*Pongo spp*.) growth curves and determination of parturition dates

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Introduction

Current data is lacking in species specific fetal growth curves and gestation lengths for orangutans.[1-6] The goal of this project is to compile existing fetal ultrasound and birth date information as well as continue to gather future information in the hopes of creating more accurate and species-specific fetal growth curves for orangutans. Often, special training and alterations to social groups are necessary when dealing with pregnancies and new births. Data of this nature can benefit institutions via improved planning for their training and social structure changes. Additionally, in cases of animals that have had previous difficult births or emergency cesarean sections, accurate determination of gestational age for scheduling future cesarean sections can be the difference between the life and death of both the dam and the infant. In time, as more information is gathered, this information may also lead to further research efforts or even help to identify abnormalities in fetuses prior to birth.

Materials and Methods

Existing fetal ultrasound measurements and corresponding copulation/birth date information will be compiled to create an initial database and growth curve. A single certified ultrasonographer will analyze the existing information to confirm measurements and reduce multiple-user inconsistencies. In addition to existing information, this project aims to collect gestation data of future births from participating institutions. A protocol has been created with the guidance of a certified ultrasonographer and will be distributed to participating institutions with specific instructions for views to obtain, points to measure, and frequency of collection. The protocol will help to make the collected data more uniform and reliable. This form has been attached for your review.

Specific data to be collected will include sire and dam species, weight, date of birth, and identification information, known dates of the dam's last menses and copulations, and fetal ultrasound measurements including crown rump length, biparietal diameter, head circumference, abdominal circumference, femur length, and humerus length. For data collected on active cases, data and corresponding ultrasound images will be collected every two weeks and sent to the primary investigator for review and compilation once monthly. Please refer to the attached protocol for specific guidelines on collection of these data points.

A standardized form has also been created for institutions to use when reporting data. This will also allow institutions to comment on the quality of the session, position, and cooperation of the patient to better gauge the quality of the information collected. This form has also been attached for your reference.

Initially, a single growth curve will be created for all orangutan species. In time, as more information is collected, the information will be divided to create more specific growth curves. For example, separate curves may be created for Bornean vs. Sumatran orangutans, male vs. female fetuses, etc.

This project aims to collect a minimum of forty data sets with all information gathered relating to one pregnancy counting as one data set. Although this project aims to collect all forty data points within the next three to five years, this project may continue for several years until significant overlap occurs among data within specific growth curves. Due to the long nature of this project, this request will be renewed annually until a suitable number of samples have been collected.

Shipping Instructions

There are no true biomaterials to be collected; therefore no permits, licenses, or shipping instructions are necessary. Collected images and measurements can be emailed directly to the principal investigator at brittany.rizzo@toledozoo.org.

Distribution of Information and Acknowledgements

A poster has been accepted for presentation at the 2014 AAZV Conference relating to this project to increase awareness among institutions and reach out to potential participants. Once sufficient data has been collected to allow for species-specific growth curves, the information will be submitted for presentation at the next AAZV conference and publication in the Journal of Zoo and Wildlife Medicine. Resulting information will be freely shared with the SSP and compiled growth curves will be shared among participating institutions. To preserve confidentiality, compiled growth curves shared with participating institutions and presented or published will not contain any specific institution information. If individual institutions wish, they may also be provided with graphs created from information collected from their individual data.

Acknowledgement of the Orangutan SSP and participating institutions will be made either in a concluding slide of PowerPoint presentations or in the Acknowledgement section of any publications.

Selected references

1) *Expanding Your Clinical Experience- Ultrasound for Women's Health Care Protocol Guides*. Netherlands: Philips, 2006.
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4) Stoskopf, M.K. and R. Sanders. 1980. Applications of diagnostic ultrasound in nonhuman primates. Proc. Am. Assoc. Zoo Vet. 110-113.
5) Suedmeyer, W.K. 2002. Conditioning programs for transabdominal ultrasound gestational monitoring in an Eastern black rhinoceros (*Diceros bicornis michaeli*), African elephant

(*Loxodonta africana*), African lion (*Panthera leo*), and Bornean orangutan (*Pongo pygmaeus pygmaeus*). Proc. Am. Assoc. Zoo Vet. 50-52.

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