SMART DEVICES FOR BIONIC DESIGN AND PROCESS DATA SCHEDULING

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The artificial intelligence requires scheduled process data to support the bionic design. We implemented and described some empirical cases describing a new method to assure the continuous improvement via smart devices.
Keywords: Smart devices, process data.

1. Introduction

The design of bionic models needs process data scheduling for future artificial intelligence (AI) integration [1]. Unfortunately, the high number of variables and the limits of elaboration software do not allow the selected object modelling [2] for the dynamic simulation and the future process development related to human mimicry and autonomous regeneration [3]. Hence, we utilised different types of smart devices [4] to acquire 3D morphologies with the automated predictive innovation loop [2]. The reconstructed models were utilised for the surgical training and for *in-vitro/in-vivo* tests, verifying the predicted process parameters for future analysis [5].

2. Materials and Methods

We acquired and elaborated different human and animal anatomical parts with Dual-source computer tomography or magnetic resonance imaging and 3D scanner. The resulted standard triangle language file was imported in the computer aided design software, for the geometrical parameters evaluation, obtaining values useful for the additive manufacturing technology of different materials (hard and soft). Finally, we used the 5D model for training and surgery activities with bio-based materials, evaluating the viability and interaction on *in-vitro* and *in-vivo* tests.

3. Results and discussion

The continuous improvement of bionic model design (Table 1) requires: 1) the operative process standardisation using the automated predictive innovation; 2) the human cyber physical space identification (design, technology and technique); 3) the digital bio-library implementation. Once obtained the final digital models, we started the AI training, merging the data obtained from synthetic models with the real one, acquiring the related parameters for the simulation. Finally, we verified the obtained process data with the planned therapy for future clinical AI predictive elaboration.

4. Conclusion

The personalised medicine cyberspace generates a huge amount of data useful to train the AI for the pathology autonomous recognition. The proposed method, based on smart devices, make possible to design neural networks able to support clinicians response in line with the society 5.0 process data.

Table 1 Bionic design and process data scheduling.

Method	Bionic printing design	Smart devices
Big-data	Pre-printing	Computer tomography, magnetic resonance imaging and microscope
AD and NGIM	Printing	Microscope and/or 3D scanner
Zero failure activity	Post-printing	3D scanner and/or camera
Operative process	Surgical planning	All previous technologies with co-working elaboration software
Process data	Application and 3DPP validation	All previous technologies and smart systems for the neural network implementation

AD= advanced diagnostic; NGIM=new generation of intelligent manufacturing; 3DPP=3D partial processes.

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