

ORIGINAL ARTICLE

**Do we perform surgical programming well? How can we improve it?☆**



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**Abstract** The objective is to establish the duration of our interventions, intermediate times and surgical performance. This will create a virtual waiting list to apply a mathematical programme that performs programming with maximum performance.

**Material and methods:** Retrospective review of 49 surgical sessions obtaining the delay in start time, intermediate time and surgical performance. Retrospective review of 4045 interventions performed in the last 3 years to obtain the average duration of each type of surgery. Creation of a virtual waiting list of 700 patients in order to perform virtual programming through the MIQCP-P until achieving optimal performance.

**Results:** Our surgical performance with manual programming was 75.9%, ending 22.4% later than 3 pm. The performance in the days without suspensions was 78.4%. The delay at start time was 9.7 min.

The optimum performance was 77.5% with a confidence of finishing before 15 h of 80.6%. The waiting list has been scheduled in 254 sessions.

**Discussion:** Our manual surgical performance without suspensions (78.4%) was superior to the optimal (77.5%), generating days finished later than 3 pm and suspensions. The possibilities for improvement are to achieve punctuality at the start time and adjust the schedule to the ideal performance.

The virtual programming has allowed us to obtain our ideal performance and to establish the number of operating rooms necessary to solve the waiting list created.

**Conclusions:** The data obtained in virtual mathematical programming are reliable enough to implement this model with guarantees.

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**PALABRAS CLAVE**

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**¿Realizamos bien la programación quirúrgica? ¿Cómo podemos mejorarla?**

**Resumen** El objetivo es conocer la duración de nuestras intervenciones, tiempos intermedios y rendimiento quirúrgico. Con ello elaborar una lista de espera virtual para aplicar un programa matemático que realice la programación con rendimiento idóneo máximo.

**Material y métodos:** Revisión retrospectiva de 49 sesiones quirúrgicas obteniendo el retraso en la hora de comienzo, el tiempo intermedio y el rendimiento quirúrgico. Revisión retrospectiva de 4.045 intervenciones realizadas en los 3 últimos años para obtener la duración media de cada tipo de cirugía. Elaboración de una lista de espera virtual de 700 pacientes para realizar programaciones virtuales mediante el MIQCP-P hasta obtener el rendimiento óptimo.

**Resultados:** Nuestro rendimiento quirúrgico con programación manual es del 75,9%, finalizando el 22,4% más tarde de las 15 h. El rendimiento en las jornadas sin suspensiones es del 78,4%. El retraso en la hora de comienzo es de 9,7 min.

El rendimiento óptimo es del 77,5%, con una confianza de terminar antes de las 15 h del 80,6%. La lista de espera se ha programado en 254 sesiones.

**Discusión:** Nuestro rendimiento quirúrgico manual sin suspensiones (78,4%) es superior al idóneo (77,5%) generando jornadas finalizadas más tarde de las 15 h y suspensiones. Las posibilidades de mejora son lograr la puntualidad en la hora de comienzo y ajustar la programación al rendimiento idóneo.

La programación virtual nos ha permitido obtener nuestro rendimiento idóneo y conocer el número de quirófanos necesarios para resolver la lista de espera creada.

**Conclusiones:** Los datos obtenidos en la programación matemática virtual son lo suficientemente fiables como para implantar este modelo con garantías.

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**Introduction**

The progressive ageing of the general population will inexorably entail an increase in pathologies derived from this ageing, and the fact our health system must adapt to this increase. Orthopaedic and trauma surgery, our speciality, is possibly one of the most affected. Over recent years there has been an exponential increase in the number of fractures derived from ageing and degenerative joint pathology, especially of the lower limb. This factor, together with progress and medical technology advances offering further surgical options with good outcomes has led to an enormous demand for surgery in our speciality, both emergency and scheduled. Waiting lists are difficult to resolve due to high health costs and obtaining the proportional increases of necessary resources to resolve this problem of today.<sup>1</sup> Appropriate management of waiting lists is crucial, not just from a patient's health point of view, but also regarding other socio sanitary aspects, since this underlines a misalignment between the social sanitary demand and the offer which the state provides. The resolution of the waiting lists depends more than the number itself of patients included, of the assignation of resources and not so much their direct increase but correct and appropriate management.<sup>1,2</sup>

Operating rooms are the most costly of all resources, and are the most limited, as they become the bottle-neck in the process,<sup>3,4</sup> which is why it is essential to obtain maximum performance from them. A reduction in costs per process also forms part of appropriate management and

planning, as does a reduction in patients on the waiting list for operations.<sup>4</sup> At present the programming of each day in surgery is carried out manually, empirically and subjectively, with time in surgery being presupposed based on the experience of the service, which carries out the programming and hospital habits and characteristics.

The performance or use of an operating room is measured by its rate of occupation, which is the ratio between the time available and the real time in which it is occupied by a patient. However, ideal performance of an operating room has not been defined, on the understanding that the higher its occupation rate, the better the management as this indicates more patients have been operated on that day and the resource has been maintained active for longer. However, this may mean a prolongation of the working day which may lead to friction, conflicts and a problem in compensating for the activity outside working hours.<sup>5</sup>

The performance of an operating room depends on the time the operations begin and their duration. Time in surgery has to include the time of anaesthesia, surgery and the time between operations, i.e. cleaning and preparing the operating room between one operation and the next. Many factors need to be taken into consideration when programming surgery, some of which are difficult to control and also little known or studied, which explains why they are difficult. Appropriate occupation rates from 75% to 90% have been published, both very different, using often ill-defined methodologies for the purpose which vary from one hospital to another.<sup>1,5</sup> Surgical performance figures are a constant

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