

# Use of the omentum in plastic surgery

ION KIRICUTA







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PERGAMON PRESS  
OXFORD — NEW YORK — TORONTO — SYDNEY — PARIS — FRANKFURT

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EDITURA MEDICALĂ  
ROMANIA

Jacket after:

## **Tabulae anatomicae**

Iulius Casselius Placentinae

Venice 1627

U.K.	Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, England
U.S.A.	Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, New York 10523, U.S.A.
CANADA	Pergamon of Canada, Suite 104, 150 Consumers Road, Willowdale, Ontario M2 J1P9, Canada
AUSTRALIA	Pergamon Press (Aust.) Pty. Ltd., P.O. Box 544, Potts Point, N.S.W. 2011, Australia
FRANCE	Pergamon Press SARL, 24 rue des Ecoles, 75240 Paris, Cedex 05, France
FEDERAL REPUBLIC OF GERMANY	Pergamon Press GmbH, 6242 Kronberg/Taunus, Pferdstrasse 1, Federal Republic of Germany

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Translated from The Romanian by IOANA STURZA  
and Prof. MIHAIL BOGDAN

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First edition 1980



British Library Cataloguing in Publication Data

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Kiricuta, Ion

*Use of the omentum in plastic surgery.*

1. Peritoneum — Transplantation

2. Surgery, Plastic

I. Title

617' .95

RD120.7

80-40562

ISBN 0-08-026352-6

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No progress is ever made by clinging to methods  
of times past

RENÉ LERICHE

## Introduction

This book embraces over twenty years of experience in using the omentum in plastic surgery. I believe that my experience in this field is unequalled anywhere and my contribution is this unique text which calls the attention of surgeons to the immense possibilities of the omentum as a plastic material for various fields of surgery.

Although the omentum has been used as plastic material for one hundred and fifty years its uses have long been confined to peritonizations, strengthening of precarious sutures of the digestive tract or the revascularization of organs. In the latter field expectations were greater than the results.

In 1956 and 1963 I published the results I obtained in the treatment of post irradiation vesico-vaginal fistulas and of extensive cervico-thoracic radionecroses as well as in combating chronic lymphoedema of the limbs. These reports were milestones in the development of techniques for using the omentum in reconstructive surgery; previously inoperable problems were now successfully treated by omentoplasty.

Of a sudden, the above mentioned infirmities which apparently had no therapeutic solution became easy to cure due to omentoplasty.

At the beginning of the century the great French surgeon Jaboulay (1860—1913) was right when he made the wisecrack that «La chirurgie est la science des trucs». Perhaps nowhere else does his comment find a truer application than in the use of the omentum as plastic material in surgery.

Numerous techniques of mobilizing and lengthening the omentum devised by myself through the years and which are all based on technical surgical artifices have led to its use from the neck to the knees. I have recently succeeded, by new techniques, to transfer it to other parts of the body from the vertex to the metatarsus.

After successes obtained in numerous fields, it is safe to say that use of the omentum as plastic material opens up new vistas in plastic surgery among which deserve special mention:

1. Treatment of post-irradiation vesico-vaginal fistulas (1954, 1956);
2. Treatment of extended radionecrosis of the chest (1963);



3. Treatment of chronic lymphoedema of the arm (1963);

4. The possibility of covering the defect, after broad extirpation for cancers of the breast, with omentum immediately grafted with free skin flaps (1963).

These are only the fields in which my new techniques have been great successes.

I have also tried to use the omentum to solve other difficult situations. The results were particularly interesting and deserve attention although the techniques concerned were limited to sporadic cases.

Among these are:

5. The treatment of giant pharyngostomas by omentoplasty;

6. Omentovaginoplasty (1960);

7. Omentocystoplasty (1960);

8. Distal transposition of free omental flaps (e.g. in the cervical area) by vascular anastomosis (experimental study, 1970);

9. The possibility of reconstructing the penis with omentum (1978);

10. Use of the omentum as plastic material in reconstruction of the injured hand. (1974—1976).

Many of these methods of using the omentum have already been confirmed in practice; with others, tested in few cases, there is room for technical improvement. The number of cases is as yet limited (215 cases in all) and future experience alone will definitely establish the place and the importance of the omentum in plastic surgery. I believe that some of the techniques recommended by me for the first time will be improved, while others will prove risky and with fewer chances of success.

The experience I have gained in the two hundred and fifteen cases operated by omentoplasty, and which — I repeat — is so far the richest experience known in the field, warrants my firm belief in the importance of the omentum in plastic surgery. Its precise indications and limitations will, of course, be established in time.

I was greatly encouraged by the fact that the methods recommended gave rise to the greatest interest in numerous highly reputed surgical centres throughout the world.

In 1970 the American Urological Association awarded A. Goldstein and me first prize for our omento-vesicoplasty.

Since 1971 Professor Claude Dufourmentel's clinic in Paris has used the omentoplasty method calling it The Kiricuta method.

In 1974 the French Congress of Surgery organized a panel discussion on the theme Uses of the Great Omentum in Surgery. The discussions in which French surgeons including Cl. Dufourmentel, R. Kuss, A. Bouchet, P. Banzet, M. Texier, A. Picaud, M. Abbes, A. Bourgeon, M. Malafosse, Cl. Mercier, C. Couinaud and H. Richelme (moderator) took part were centred around numerous aspects dealt with in the present book.

In 1975 the International Congress of Plastic and Reconstructive Surgery held in Paris with Professor Cl. Dufourmentel in the chair organized a panel discussion on the Uses of the Omentum in Plastic Surgery. Almost all those who had made recent contributions to omentoplasty were invited — among them: I. Baruch, M. Abbes, P. Banzet, L. Clodius, C. Dupont, H. Goldsmith, A. Goldstein, Ph. Micheau, V. Popescu, E. Vaubel, etc. and I was chairman.

Meanwhile, at various Faculties of Medicine in Europe, dissertations were submitted on omentoplasty procedures recommended by me. Here are some of the names of the authors: Dr. E. Vaubel who visited our clinic in 1967 submitted in 1969 to the Faculty of Medicine in West Berlin a dissertation on the transposition of the omentum. H. Penet-Lambert (1973) dealt with the same theme in Professor Dufourmentel's clinic in Paris. Dr. I. Vallicioni (1973) in Dr. Abbas's clinic in Nice, Dr. I. P. Roulet (1975) in Professor Y. Bouchet's clinic in Grenoble, Dr. P. Micouleau (1975) in Professor Ph. Micheau's clinic in Toulouse and Dr. A. Haertig (1976) in Professor I. Baruch's clinic in Paris all submitted dissertations on similar subjects.

In our clinic the following doctoral dissertations were submitted:

— Dr. D. Munteanu: The Possibilities of Using the Great Omentum and the Stomach in Cystoplasty and Ureteroplasty (1964);

— Dr. V. Popescu: Aspects of Repair Surgery on Irradiated Tissues (1969);

— Dr. Koloszvári Alfred: The Surgery of the Great Omentum (1969).

In Professor I. Juvara's surgical clinic in Bucharest, Dr. S. Iliescu in 1972 elaborated the dissertation on The Surgery of the Great Omentum which also deals with the uses of the omentum in plastic surgery.

The foregoing data show to what extent this aspect of plastic surgery has been on the minds of surgeons for the last ten to fifteen years. Numerous articles have been published by distinguished specialists in plastic surgery, emphasizing the advantages of the method.

Recent trends in favour of using the omentum in reconstructive surgery were an incentive to set forth in detail my experience in this new field of surgery.

One thing must be made clear from the very beginning: that although surgical techniques presented are apparently simple they require great skill. Any mistake e.g. the rupture of a vessel by exerting too great traction on the omentum, a misplaced ligature or detachment of the omentum from the stomach beyond permissible bounds, may lead to necrosis of the entire omentum and thus compromise the operation. The surgeon must be fully acquainted with omentoplasty techniques and his entire team must be well trained. The team there needs an abdominal surgeon and a specialist in plastic surgery. A plastic surgeon doing the operation alone would be a bit risky. There are moments when the responsibility is that of the general surgeon but there are also moments when the entire responsibility rests with the plastic surgeon.

In some cases the operation must be performed by two teams e.g. in cases of severe injuries of the hand when one team deals with the hand while the other mobilizes the omentum.

This book manifests some of our concern over the difficult problems that had to be overcome in devising each of the methods recommended. I have made this clear as in some recently published studies on the great omentum no reference is made to my pioneering activity in this field, an activity which stands at the basis of the successes obtained.

I began using the great omentum in 1954 in the treatment of post-irradiation vesico-vaginal fistulas. Since then I have done my utmost to further the use of this wonderful biological material in almost all fields of plastic surgery. In 1974 I began using it in reconstructive surgery of the hand and achieved remarkable successes.

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All these publications are cited in the bibliographical list at the end of each chapter.

I cannot conclude this introduction without due thanks to my co-worker Dr. V. Popescu who assisted me in most of the surgery. It was Dr. V. Popescu who so effectively cut off the free skin grafts with the electrodermatome. He has reached an invaluable skill in the technique of omentoplasty.

I would also like to thank Dr. S. Galatar, my co-worker, who so painstakingly studied vascularization of the omentum on 50 cadavers, bringing an essential contribution to this field.

As for me, it is my great satisfaction to have made a small contribution towards reinstating the omentum — this Cinderella of the abdomen — to its prospective role in plastic surgery.

## I. KIRICUTA

CLUJ-NAPOCA,  
January 7, 1979

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„Monsieur et Cher Collègue Kiricuta,  
Je vous adresse par ce même courrier le programme de  
notre Table Ronde sur le grand épiploon en chirurgie.  
J'ai pensé que la meilleure formule pour vous, qui êtes  
le père de la méthode indiscutablement, serait d'intervenir  
lorsque vous le souhaitez tout au long de la Table  
Ronde.

Prof. Dr. HENRI RICHELME, president of  
the Round Table: „L'Utilisation du grand  
épiploon en chirurgie".  
76<sup>e</sup> Congrès Français de Chirurgie, Paris,  
1974.

„The use of the omentum in extracelomic location is, not  
new. Priority for its deliberate use for reconstructive  
purposes probably goes to Kiricuta of Romania, who  
in 1956 reported the use of the omentum in the repair of  
vesico-vaginal fistulae and later for the repair of broncho-  
pleural fistulae, the reconstruction of the chestwall and  
the palliation of lymphedema".

JURKIEWICZ M. J.: ARNOLD P. G. (Depart-  
ment of Surgery, Emory Univ. Atlanta,  
Georgia): *Annals of Surgery*, 1977. 185, 5.  
pp. 548—554.

Dear Doctor Kiricuta:

...Your contributions in this regard over the last twenty  
years have been absolutely outstanding and deserve a  
special place in: „The History of the Surgical Utiliza-  
tion of the Greater Omentum".

PHILLIP G. ARNOLD, M. D., Plastic and  
Reconstructive Surgery, Mayo Clinic Roches-  
ter, Minnesota, U.S.A.

(extract from the letter dated from 30, May,  
1979).

## History

An entire volume could be written on the history of the great omentum as applied to plastic surgery. During the last two centuries surgeons racked their brains in search of ways to use the omentum in different fields of surgery. This chapter will deal exclusively with the history of the omentum as used in plastic surgery.

For simplicity in this introductory chapter, we shall briefly outline the history of the problem as dealt with by two plastic surgeons in their doctoral dissertations.

In his dissertation prepared in the Clinic of Reconstructive Surgery under Professor Cl. Dufourmentel of Paris, H. Penet-Lambert (1973) writes:

"The first publications about the use of the great omentum belong to the 19th century.

In 1896, Durmond and Morison thought of using it in the treatment of ascites.

In 1914, Hallopeau used an omentum free graft to fill a large gap following the loss of pleural matter after excision of a thoracic tumour.

Subsequently, use of the great omentum in abdominal surgery for protecting a suture, packing a gap in the parenchyma or peritonization in more difficult cases is well-known.

In 1956, Kiricuta reported remarkable results in the treatment of post-irradiation vesico-vaginal fistulas by omentoplasty.

Some years later, in the treatment of the vast losses of substance caused by radionecrosis in cancer of the breast, he thought of using extra-abdominally, a pedicled omental flap which he covered with thin skin grafts.

Over the last 10 years the omentum has been the subject of numerous experimental investigations and was used in the most varied fields.

In 1967, Goldsmith obtained improvement in a case of chronic lymphoedema and of periferal vascular deficiency by transposition of a pedicled omental flap.

The following year, the same author demonstrated the role of the omentum in the control of infection in experiments on dogs with vascular dacron prostheses: the omental flap implanted around the vascular prosthesis prevented or limited infection of the prosthesis.

In 1970, Ruckley and Smith used the omentum to close perineal fistulas, and Goldsmith prevented rupture of the carotid artery after latero-cervical lymphadenectomy followed by radiotherapy.

Parallel anatomical studies described the omental vascularization, a factor upon which the possibility of mobilizing and lengthening the omentum depends (Kiricuta-Galatâr, 1970; Alday-Goldsmith, 1972). Today a new field has been opened, namely free transplantation with vascular anastomoses, facilitated by progress in vascular micro-surgery (Crowell-Yasargil, 1969; etc.).

In a recent paper, P. Micouleanu presented (1975) the following history of the problem:

The great omentum was first used in omentoplasty. In 1826 Jobert and Lambelle described the principle of the method. In case of an intestinal wound they recommended to take the omentum and insert a thin strip between the raw edges of the wound without detaching it from the rest of the omentum. The procedure was abandoned because of occlusions caused by intestinal bridges.

Subsequently, the omental graft was largely used and became the subject of many experimental and clinical studies: Aimes (1926) presented a list of surgeons who had employed this technique.

In 1956, Kiricuta reported very good results obtained by omentoplasty in the treatment of vesico-vaginal fistulas following irradiation. Some years later (1963) he thought of using the omentum extra-abdominally, maintaining a pedicle and covering it with thin skin grafts for the treatment of vast losses of substance in radionecroses after cancer of the breast.

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\* The first case of chronic oedema of the arm improved by implantation of the omentum in the axilla was published by Kiricuta in 1963, *La Nouvelle Presse Médicale* (Paris), 1963, 1, 15-17.



In 1971, Casten transposed the omentum for revascularization of the lower arteritic limb in patients threatened by amputation.

During the last 10 years, the development of vascular microsurgery has made it possible to transplant the omentum with vascular anastomoses.

In 1971, Kiricuta, in experimental surgery on a dog pulled the omentum to the region of the neck, anastomosing the latero-cervical vessels with the vessels of the omentum taken "en bloc" and with the splenic vessels.

In 1972, Mc Lean and Buncke were able for the first time in man to transplant the omentum to the neck, with vascular anastomoses in order to cover a large loss of substance of the scalp.

\*

These two authors evidently offer only a cursory view of the history of the problem.

Outstanding contributions to the development of plastic surgery with use of the great omentum were also brought by O'Shaughnessy, B. Bastiaanse, Cl. Dufourmentel, R. Küss, M. Texier, P. Banzet, A. Bouchet, Y. Bouchet, M. Malafosse, A. Bourgeon, J. Baruch, Ph. Micheau, A. M. Goldstein, Turner-Warwick, J. Preaux, M. Abbes, H. Richelme, F. Vaubel, Ch. Dupont, J. P. Roulet, A. Haertig, B. Cathala, E. Martin, Le Quang, C. Chatelain and others.

Among the Romanian surgeons who have important contributions to omentum plastic surgery are: I. Juvara, Fl. Mandache, D. Burlui, V. Popescu, A. Pandeale, O. Rațiu, S. Iliescu, S. Galatâr, G. Iliescu and D. Munteanu.

The contributions of these authors directly connected with the topic of this study will be amply presented below.

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## CHAPTER 1

# Embryogenesis, anatomy and vascularization of the great omentum

Knowledge of the vascular anatomy of the great omentum is of great practical importance to the surgeon and we shall briefly outline the classical notions of embryology and descriptive anatomy, with emphasis upon the vascularization of the omentum.

*The extensive possibilities of mobilizing the omentum and pulling it through into distal anatomic regions «from the neck to the knees» (Kiricuta, 1963) implies thorough knowledge of its vascularization. Any deviation from laws of omental mobilization, with intact maintenance of its vascularization, exposes the patient to the most severe complication: omental necrosis which may be fatal.*

Paitre rightly compares the omentum with a rectangular apron consisting of mesenchymal (connective) tissue, loaded with immunologically competent cells and extremely rich in arterial, venous and lymphatic vessels.

The connective tissue surrounding these vessels is a site for the accumulation of fat. The omental apron is lined with endothelial cells, as is the entire peritoneal serosa. The size of the omentum varies largely, being very well developed in some subjects and descending into the pelvis, and almost nonexistent in others.\* There is no relationship between the somatic constitutional type and the degree of omental

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\* The phylogenetic development of the great omentum is very interesting. Fish and reptiles have no omentum. Birds have a rudimentary omentum also containing hematopoietic foci. In mammals this organ is well developed, being less vascularized in herbivores and richly vascularized in carnivores and omnivores.

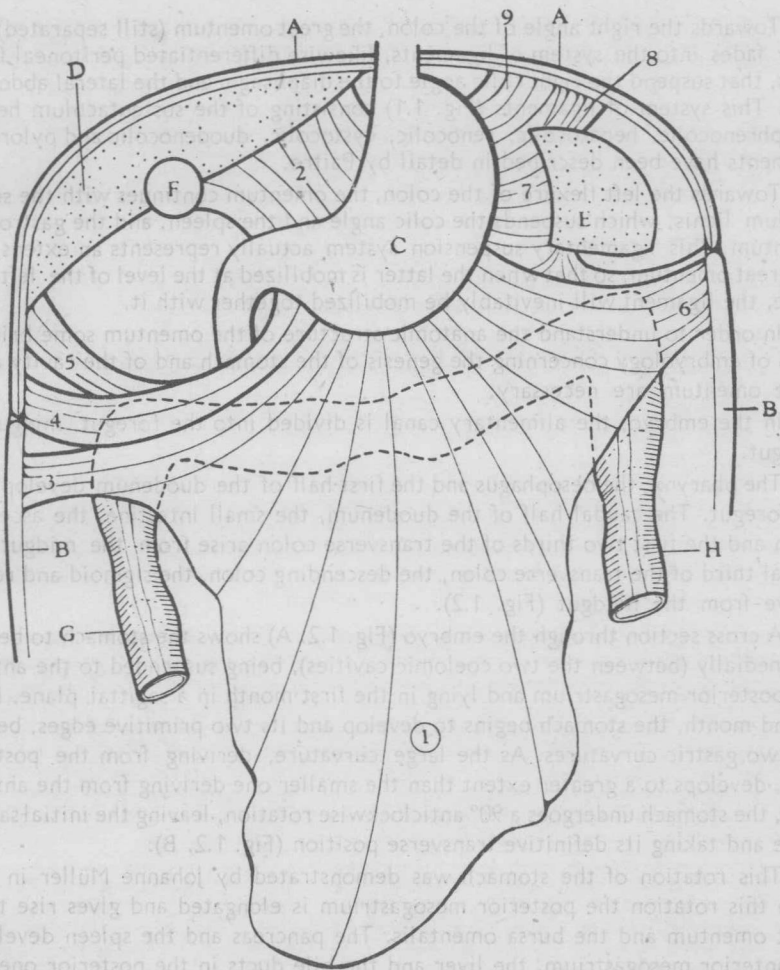


Fig. 1.1 — The great omentum and annex epiploic formations

A = diaphragm; B = abdominal wall; C = stomach; D = liver; E = spleen; F = gallbladder; G = ascending colon; H = descending colon.

1 = great omentum; 2 = lesser omentum; 3 = right parietocolic ligament; 4 = right phrenocolic ligament; 5 = hepatocolic ligament; 6 = left parietocolic ligament; 7 = gastrosplenic ligament; 8 = phrenosplenic ligament; 9 = phrenogastric ligament.

The embryonic cavity of the bursa omentalis, situated between the posterior development. In general the omentum of fat subjects is more abundantly infiltrated with fat and better developed.

The omental apron is attached to the horizontal segment of the greater curvature of the stomach, descends towards the transverse colon to which it closely adheres (also known as gastro-colic omentum or gastro-colic ligament), then hangs down separating the transverse colon and small intestine loops from the anterior abdominal wall.



Towards the right angle of the colon, the great omentum (still separated) gradually fades into the system of ligaments, likewise differentiated peritoneal formations, that suspend the right colic angle to the diaphragm and the lateral abdominal wall. This system of ligaments (Fig. 1.1) consisting of the sustentaculum hepatis, the phrenocolic, hepatocolic, renocolic, cystocolic, duodenocolic and pylorocolic ligaments have been described in detail by Paitre.

Towards the left flexure of the colon, the omentum continues with the sustentaculum lienis, which suspends the colic angle and the spleen, and the gastrolial omentum. This ligamentary suspension system actually represents an extension of the great omentum, so that when the latter is mobilized at the level of the left colic angle, the ligament will inevitably be mobilized together with it.

In order to understand the anatomic structure of the omentum some brief notions of embryology concerning the genesis of the stomach and of the cavity of the great omentum are necessary.

In the embryo, the alimentary canal is divided into the foregut, midgut and hindgut.

The pharynx, the oesophagus and the first half of the duodenum develop from the foregut. The caudal half of the duodenum, the small intestine, the ascending colon and the first two thirds of the transverse colon arise from the midgut. The caudal third of the transverse colon, the descending colon, the sigmoid and rectum derive from the hindgut (Fig. 1.2).

A cross section through the embryo (Fig. 1.2. A) shows the stomach to be located medially (between the two coelomic cavities), being suspended to the anterior and posterior mesogastrium and lying in the first month in a sagittal plane. In the second month, the stomach begins to develop and its two primitive edges, become the two gastric curvatures. As the large curvature, deriving from the posterior edge, develops to a greater extent than the smaller one deriving from the anterior edge, the stomach undergoes a 90° anticlockwise rotation, leaving the initial sagittal plane and taking its definitive transverse position (Fig. 1.2. B).

This rotation of the stomach was demonstrated by Johanne Müller in 1930. With this rotation the posterior mesogastrium is elongated and gives rise to the great omentum and the bursa omentalis. The pancreas and the spleen develop in the anterior mesogastrium, the liver and the bile ducts in the posterior one (Fig. 1.2. C).

A sagittal section through the fetal stomach (closer to the pylorus) (Fig. 1.3. A) helps us to understand more clearly the formation of the bursa omentalis and greater omentum from the four peritoneal layers deriving from the elongated, plicated posterior mesogastrium, after rotation of the stomach.

The embryonic cavity of the bursa omentalis, situated between the posterior aspect of the stomach and the pancreas, extends in front of the transverse colon between the layers of the great omentum, forming a free space between the two descending peritoneal folds, from the anterior and posterior aspects of the stomach and the two ascending peritoneal folds of the great omentum. The two posterior ascending folds pass above the transverse colon (also covered by peritoneal serosa), over the upper aspect of the transverse mesocolon, and finally reach the pancreas, enveloping it anteriorly and posteriorly. Therefore, in the embryo, the omentum